



Rappahannock Westminster-Canterbury
Stuart A. Bunting, President & CEO

September 28, 2011

Mr. Andrew J. Hammond II, P.E.
Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

Piedmont Regional Office
SEP 29 2011
RECEIVED

RE: Response to Application Review: Rappahannock Westminster-Canterbury Waste Water Treatment Facility Permit Renewal Submittal (VA0091511): Effective: March 28, 2007

Dear Mr. Hammond:

Enclosed is one updated original hardcopy and one electronic copy (CD enclosed) of the permit renewal application materials for the above-referenced permit due to expire on March 27, 2012. Updates are based on your letter dated September 16, 2011. Corrections of the noted deficiencies are summarized below for convenience.

EPA Form 2A

- A.2, Applicant Name: The 2006 permit indicates that the applicant/owner of the facility is Rappahannock Westminster-Canterbury, Inc. Please reconcile and revise as necessary.
 - Revised to Rappahannock Westminster-Canterbury Inc.
- A.3: Permit No. VA0091511 should be listed in the National Pollutant Discharge Elimination System (NPDES) heading.
 - Revised form as instructed.
- A.11.b: Federal secondary treatment standards require 85% removal of BOD5 (or cBOD5) and TSS. Please verify the design removal rates for the proposed wastewater treatment facility and revise as necessary.
 - Revised to 85% removal.

VPDES Sewage Sludge Application

- A.1.e: Please provide an answer to this question.
 - Answer: No. Revised form.
- A.6: Please provide a line drawing and/or narrative that describes how sewage sludge will be processed and/or handled at the proposed wastewater treatment facility.
 - Revised per 2007 permit: Permittee will develop a sludge management plan when plans and specifications for the treatment works are finalized.
- D: Please indication if this section is applicable to the proposed wastewater treatment facility.
 - Revised form as instructed.

132 Lancaster Drive, Irvington, VA 22480
804.438.4003 sbunting@rw-c.org

VPDES Permit Application Addendum

- 1: The 2006 permit indicates that the applicant/owner of the facility is Rappahannock Westminster-Canterbury, Inc. Please reconcile and revise as necessary.
 - Revised to Rappahannock Westminster-Canterbury Inc.

VPA Form A

- 1: The VPDES permit application identifies the facility as Rappahannock Westminster-Canterbury WWTF. Please reconcile and revise as necessary.
 - Revised to Rappahannock Westminster-Canterbury Inc.
- 4: The facility's existing permit is a Virginia Pollutant Discharge Elimination System (VPDES) permit. The VPA reference is no longer applicable.
 - Revised form to delete VPA reference as instructed.

VPA Form D

- Part D-I, 1: The VPDES permit application identifies the facility as Rappahannock Westminster-Canterbury WWTF. Please reconcile and revise as necessary.
 - Revised form to Rappahannock Westminster-Canterbury WWTF
- Part D-I, 8: Please see my comments below regarding Part D-III.
- Part D-I, 9: Please provide calculations describing the nutrient value of the effluent as mg/L of potassium. Please be advised that the 2006 permit requires monitoring and reporting for Total Potassium on a schedule of once every five years.
 - Revised form to include potassium. 16.20 mg/l equaling 104.59 pounds/acre/yr
- Part D-I, 10: Please provide an annual water balance (on a monthly basis) incorporating precipitation, evaporation, monthly storage, etc. Please provide calculations justifying the existing spray field acreage based upon the annual water balance.
 - Revised Part D-I, 10 as requested. An annual water balance analysis for January 2008 – June 2011 indicates that the Rappahannock Westminster-Canterbury WWTF is within the guidelines of the maximum hydraulic load of the land application field 40.948 MG or 104 inches/acre per SCAT regs (9VAC25-790). The maximum hydraulic load for the 14.5 acres is 238 inches/acre (per table). Thus the limiting factor is lower SCAT reg. 40.948 MG or 104 inches. During the analysis time period, the maximum annual (2009) hydraulic load was 38.713 MG including influent, precipitation collected in lagoons, precipitation on the land application field, net of evaporation at the rate of 50 inches/year (per the National Weather service for coastal Virginia). Volume in storage was sufficient for storage capacity ranging from 1.131 MG to 6.074 MG with a monthly

average storage of 2.800 MG. The maximum storage capacity is 10.127 MG.

- Part D-I, 11: Please provide calculations justifying the existing spray field acreage based upon crop uptake, PAN, Phosphorus, Potassium, metal loadings and Sodium Adsorption Ratio.
 - Revised Part D-I, 11 as requested. Total Nitrogen, TKN, soluble salt, manganese, and fluoride monitoring were discontinued in the permit issued March 28, 2007. Analysis of applied nitrogen, phosphorous, potassium, as well as metals (cadmium, copper, lead, nickel, and zinc) indicates none of the elements are limiting factors in the application of treated effluent on the Rappahannock Westminster-Canterbury WWTF land application field. Nitrogen is calculated to be 44.03 lb/acre which is below the 210 lb/acre limit and less than the calculation for the 2007 permit. Phosphorus is calculated to be 19.43 lb/acre with no limit and is below the 15.5 lb/acre calculated for the 2007 permit. Potassium is calculated to be 104.59 lb/acre with no limit and was not monitored prior to the 2007 permit. Metals (cadmium, copper, lead, and nickel) are below detectable limits and zinc is calculated to be 0.19 lb/acre. All metals are below limits cited in the 2007 permit taken from Table 6.6 (Recommended Limits for Metals Allowed on Agricultural Land, No Discharge Certificate Manual, 1981, SWCB: Cd 4.45 lb/acre; Cu 111 lb/acre; Pb 445 lb/acre; Ni: 44 lb/acre; Zn 222 lb/acre). The sodium adsorption ratio is 13.60 (calculated) and the exchangeable sodium is 0.7 ppm both with no limits.
- Part D-I, 15: Please provide the required soil descriptions (as defined in the application) for the supplied Soil Survey Map.
 - Revised supplied soil map to include soil descriptions: KeA=Kempsville and Wo=Woodstown. Productivity code=III.
- Part D-I, 17: Please provide soil sample results for Exchangeable Sodium, Exchangeable Calcium, Chromium Manganese, and Particle Size Analysis (or USDA textural estimate).
 - Exchangeable Sodium: 0.7 ppm; Exchangeable Calcium: 72.2 ppm; Chromium: 6.0 mg/l; Manganese: 80 mg/l. The textural classification is sandy loam (56% sand; 31.2% silt; 12.8% clay). Soil sample data for additionally requested parameters are attached.
- Part D-I, 18: Please relate the crop nutrient needs to anticipated yields, soil productivity rating and the various fertilizer or nutrient sources from the effluent and chemical fertilizers. This is typically accomplished with the submission of a DCR approved Nutrient Management Plan. DEQ acknowledges that this plan is under preparation and will be submitted in the near future.
 - Final DCR-approved Nutrient Management Plan is attached.
- Part D-I, 19: Please describe the existing cropping system including any supplemental fertilization program. This is typically accomplished with the submission of a DCR approved Nutrient Management Plan. DEQ acknowledges that this plan is under preparation and will be submitted in the near future.
 - Final DCR-approved Nutrient Management Plan is attached.
- Part D-III: Please provide at least one effluent analysis for Total Residual

Chlorine (TRC), Percent Solids, Total Potassium, and Sodium. Please provide the Detection Limit for lead, cadmium, copper, and nickel.

- Total Residual Chlorine (TRC) 2.5 mg/l; Percent Solids: 48.5%; Total Potassium: 20.3 mg/l; Sodium: 178.0 mg/l. Effluent sample data including the additionally requested parameters are attached. Detectable Limits are as follows: lead=0.05 mg/l; cadmium=0.01 mg/l; copper=0.02 mg/l; nickel=0.02 mg/l.

We are constructing a replacement for the present plant and expect that plant to be operational in fall 2011. The mass drain field has been approved and has been installed. The treatment plant has been approved by VDH and is being fabricated. It is expected on-site by the middle of October. Following the commissioning of the new treatment plant and drain field, the existing plant will be decommissioned according the closure plan for this plant that has been submitted under separate cover by Long and Associates. We expect the closure to take place as soon as weather permits in 2012.

Thank you for your assistance in the preparation of this permit renewal application. If you need any additional information please let me know.

Sincerely,

A handwritten signature in black ink, appearing to read "Stuart A. Bunting". The signature is written in a cursive, flowing style.

Stuart A. Bunting
President/CEO

VPDES PERMIT APPLICATION
FOR
RAPPAHANNOCK
WESTMINSTER-CANTERBURY
WASTEWATER TREATMENT FACILITY
EXISTING VPA PERMIT # VA0091511

FACILITY NAME AND PERMIT NUMBER:

Rappahannock Westminster-Canterbury WWTF VA0091511

Form Approved 1/14/99
OMB Number 2040-0086**FORM
2A
NPDES****NPDES FORM 2A APPLICATION OVERVIEW****APPLICATION OVERVIEW**

Form 2A has been developed in a modular format and consists of a "Basic Application Information" packet and a "Supplemental Application Information" packet. The Basic Application Information packet is divided into two parts. All applicants must complete Parts A and C. Applicants with a design flow greater than or equal to 0.1 mgd must also complete Part B. Some applicants must also complete the Supplemental Application Information packet. The following items explain which parts of Form 2A you must complete.

BASIC APPLICATION INFORMATION:

- A. Basic Application Information for all Applicants.** All applicants must complete questions A.1 through A.8. A treatment works that discharges effluent to surface waters of the United States must also answer questions A.9 through A.12.
- B. Additional Application Information for Applicants with a Design Flow ≥ 0.1 mgd.** All treatment works that have design flows greater than or equal to 0.1 million gallons per day must complete questions B.1 through B.6.
- C. Certification.** All applicants must complete Part C (Certification).

SUPPLEMENTAL APPLICATION INFORMATION:

- D. Expanded Effluent Testing Data.** A treatment works that discharges effluent to surface waters of the United States and meets one or more of the following criteria must complete Part D (Expanded Effluent Testing Data):
1. Has a design flow rate greater than or equal to 1 mgd,
 2. Is required to have a pretreatment program (or has one in place), or
 3. Is otherwise required by the permitting authority to provide the information.
- E. Toxicity Testing Data.** A treatment works that meets one or more of the following criteria must complete Part E (Toxicity Testing Data):
1. Has a design flow rate greater than or equal to 1 mgd,
 2. Is required to have a pretreatment program (or has one in place), or
 3. Is otherwise required by the permitting authority to submit results of toxicity testing.
- F. Industrial User Discharges and RCRA/CERCLA Wastes.** A treatment works that accepts process wastewater from any significant industrial users (SIUs) or receives RCRA or CERCLA wastes must complete Part F (Industrial User Discharges and RCRA/CERCLA Wastes). SIUs are defined as:
1. All industrial users subject to Categorical Pretreatment Standards under 40 Code of Federal Regulations (CFR) 403.6 and 40 CFR Chapter I, Subchapter N (see instructions); and
 2. Any other industrial user that:
 - a. Discharges an average of 25,000 gallons per day or more of process wastewater to the treatment works (with certain exclusions); or
 - b. Contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the treatment plant; or
 - c. Is designated as an SIU by the control authority.
- G. Combined Sewer Systems.** A treatment works that has a combined sewer system must complete Part G (Combined Sewer Systems).

ALL APPLICANTS MUST COMPLETE PART C (CERTIFICATION)

FACILITY NAME AND PERMIT NUMBER:

Rappahannock Westminster-Canterbury WWTF VA0091511

Form Approved 1/14/99
OMB Number 2040-0086**BASIC APPLICATION INFORMATION****PART A. BASIC APPLICATION INFORMATION FOR ALL APPLICANTS:**

All treatment works must complete questions A.1 through A.8 of this Basic Application Information packet.

A.1. Facility Information.Facility name Rappahannock Westminster-Canterbury WWTFMailing Address 132 Lancaster Drive
Irvington, VA 22480Contact person Stuart BuntingTitle President/CEOTelephone number (804) 438-4003Facility Address 132 Lancaster Drive
(not P.O. Box) Irvington, VA**A.2. Applicant Information.** If the applicant is different from the above, provide the following:Applicant name Rappahannock Westminster-Canterbury, Inc.Mailing Address SAMEContact person SAMETitle SAMETelephone number SAME**Is the applicant the owner or operator (or both) of the treatment works?**☒ owner ☐ operator

Indicate whether correspondence regarding this permit should be directed to the facility or the applicant.

☒ facility ☐ applicant**A.3. Existing Environmental Permits.** Provide the permit number of any existing environmental permits that have been issued to the treatment works (include state-issued permits).NPDES VA0091511

PSD _____

UIC _____

Other _____

RCRA _____

Other _____

A.4. Collection System Information. Provide information on municipalities and areas served by the facility. Provide the name and population of each entity and, if known, provide information on the type of collection system (combined vs. separate) and its ownership (municipal, private, etc.).

Name	Population Served	Type of Collection System	Ownership
<u>Rapp. Wstmnster-Cantrbry</u>	<u>260Resdnt. 200Emp</u>	<u>Separate</u>	<u>Private</u>
_____	_____	_____	_____
_____	_____	_____	_____

Total population served 260Resdnt. 200Emp

FACILITY NAME AND PERMIT NUMBER:

Rappahannock Westminster-Canterbury WWTF VA0091511

Form Approved 1/14/99
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A.5. Indian Country.

- a. Is the treatment works located in Indian Country?

☐ Yes ☒ No

- b. Does the treatment works discharge to a receiving water that is either in Indian Country or that is upstream from (and eventually flows through) Indian Country?

☐ Yes ☒ No

A.6. Flow. Indicate the design flow rate of the treatment plant (i.e., the wastewater flow rate that the plant was built to handle). Also provide the average daily flow rate and maximum daily flow rate for each of the last three years. Each year's data must be based on a 12-month time period with the 12th month of "this year" occurring no more than three months prior to this application submittal.

- a. Design flow rate
- 0.080VPDES
- mgd

	<u>Two Years Ago</u>	<u>Last Year</u>	<u>This Year</u>
b. Annual average daily flow rate	<u>(AR)0.029</u>	<u>(AR)0.026</u>	<u>0.023</u> mgd
c. Maximum daily flow rate	<u>0.079</u>	<u>0.070</u>	<u>0.038</u> mgd

A.7. Collection System. Indicate the type(s) of collection system(s) used by the treatment plant. Check all that apply. Also estimate the percent contribution (by miles) of each.

☒ Separate sanitary sewer 100 %
☐ Combined storm and sanitary sewer _____ %

A.8. Discharges and Other Disposal Methods.

- a. Does the treatment works discharge effluent to waters of the U.S.?

☒ Yes ☐ No

If yes, list how many of each of the following types of discharge points the treatment works uses:

i. Discharges of treated effluent 1
ii. Discharges of untreated or partially treated effluent 0
iii. Combined sewer overflow points 0
iv. Constructed emergency overflows (prior to the headworks) 0
v. Other _____ 0

- b. Does the treatment works discharge effluent to basins, ponds, or other surface impoundments that do not have outlets for discharge to waters of the U.S.?

☐ Yes ☒ No

If yes, provide the following for each surface impoundment:

Location: _____

Annual average daily volume discharged to surface impoundment(s) _____ mgd

Is discharge _____ continuous or _____ intermittent?

- c. Does the treatment works land-apply treated wastewater?

☐ Yes ☐ No

If yes, provide the following for each land application site:

Location: _____

Number of acres: _____

Annual average daily volume applied to site: _____ Mgd

Is land application _____ continuous or _____ intermittent?

- d. Does the treatment works discharge or transport treated or untreated wastewater to another treatment works?

☐ Yes ☒ No

FACILITY NAME AND PERMIT NUMBER:

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If yes, describe the mean(s) by which the wastewater from the treatment works is discharged or transported to the other treatment works (e.g., tank truck, pipe).

If transport is by a party other than the applicant, provide:

Transporter name: NA

Mailing Address: _____

Contact person: _____

Title: _____

Telephone number: _____

For each treatment works that receives this discharge, provide the following:

Name: NA

Mailing Address: _____

Contact person: _____

Title: _____

Telephone number: _____

If known, provide the NPDES permit number of the treatment works that receives this discharge. _____

Provide the average daily flow rate from the treatment works into the receiving facility. _____ mgd

- e. Does the treatment works discharge or dispose of its wastewater in a manner not included in A.8.a through A.8.d above (e.g., underground percolation, well injection)? _____ Yes ☒ No

If yes, provide the following for each disposal method:

Description of method (including location and size of site(s) if applicable):

Annual daily volume disposed of by this method: _____

Is disposal through this method _____ continuous or _____ intermittent?

FACILITY NAME AND PERMIT NUMBER:

Rappahannock Westminster-Canterbury WWTF VA0091511

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WASTEWATER DISCHARGES:

If you answered "yes" to question A.8.a, complete questions A.9 through A.12 **once for each outfall** (including bypass points) through which effluent is discharged. Do not include information on combined sewer overflows in this section. If you answered "no" to question A.8.a, go to Part B, "Additional Application Information for Applicants with a Design Flow Greater than or Equal to 0.1 mgd."

A.9. Description of Outfall.

- a. Outfall number 001
- b. Location Irvington, VA 22480
(City or town, if applicable) (Zip Code)
Lancaster VA
(County) (State)
37° - 40' - 20.6" N 76° - 23' - 55.2" W
(Latitude) (Longitude)
- c. Distance from shore (if applicable) 0 ft.
- d. Depth below surface (if applicable) 0 ft.
- e. Average daily flow rate mgd
- f. Does this outfall have either an intermittent or a periodic discharge? Yes ✓ No (go to A.9.g.)
- If yes, provide the following information:
- Number of times per year discharge occurs:
- Average duration of each discharge:
- Average flow per discharge: mgd
- Months in which discharge occurs:
- g. Is outfall equipped with a diffuser? Yes ✓ No

A.10. Description of Receiving Waters.

- a. Name of receiving water Unnamed tributary of Old Mill Cove
- b. Name of watershed (if known)
- United States Soil Conservation Service 14-digit watershed code (if known):
- c. Name of State Management/River Basin (if known):
- United States Geological Survey 8-digit hydrologic cataloging unit code (if known):
- d. Critical low flow of receiving stream (if applicable):
acute cfs chronic cfs
- e. Total hardness of receiving stream at critical low flow (if applicable): mg/l of CaCO₃

FACILITY NAME AND PERMIT NUMBER:

Rappahannock Westminster-Canterbury WWTF VA0091511

Form Approved 1/14/99
OMB Number 2040-0086**A.11. Description of Treatment.**

- a. What levels of treatment are provided? Check all that apply.

☐ Primary☐ Secondary☒ Advanced☐ Other. Describe: _____

- b. Indicate the following removal rates (as applicable):

Design BOD₅ removal or Design CBOD₅ removal 85 %

Design SS removal 85 %

Design P removal %

Design N removal %

Other %

- c. What type of disinfection is used for the effluent from this outfall? If disinfection varies by season, please describe.

Ultraviolet light irradiation

If disinfection is by chlorination, is dechlorination used for this outfall? ☐ Yes ☒ No

- d. Does the treatment plant have post aeration?
- ☐
- Yes
- ☒
- No

A.12. Effluent Testing Information. All Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.

Outfall number: 001

Representative data from facility that approximates what the proposed discharge effluent will be.

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		
	Value	Units	Value	Units	Number of Samples
pH (Minimum)	8.1425	s.u.			
pH (Maximum)	8.5533	s.u.			
Flow Rate	0.00948	MGD	0.00449	MGD	12
Temperature (Winter)	11.4	C	5.2	C	3
Temperature (Summer)	24.2	C	21.1	C	3

* For pH please report a minimum and a maximum daily value

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML / MDL
	Conc.	Units	Conc.	Units	Number of Samples		

CONVENTIONAL AND NONCONVENTIONAL COMPOUNDS.

BIOCHEMICAL OXYGEN DEMAND (Report one)	BOD-5	0.4727	KG/D	0.3467	KG/D	12	5210B	
	CBOD-5							
FECAL COLIFORM		42	N/CML	11.9	N/CML	12	9221E	
TOTAL SUSPENDED SOLIDS (TSS)		0.1081	KG/D	0.1034	KG/D	12	2540D	

END OF PART A.

REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

FACILITY NAME AND PERMIT NUMBER:

Rappahannock Westminster-Canterbury WWTF VA0091511

Form Approved 1/14/99
OMB Number 2040-0086**BASIC APPLICATION INFORMATION****PART B. ADDITIONAL APPLICATION INFORMATION FOR APPLICANTS WITH A DESIGN FLOW GREATER THAN OR EQUAL TO 0.1 MGD (100,000 gallons per day).**All applicants with a design flow rate ≥ 0.1 mgd must answer questions B.1 through B.6. All others go to Part C (Certification).**B.1. Inflow and Infiltration.** Estimate the average number of gallons per day that flow into the treatment works from inflow and/or infiltration.

NA gpd

Briefly explain any steps underway or planned to minimize inflow and infiltration.

B.2. Topographic Map. Attach to this application a topographic map of the area extending at least one mile beyond facility property boundaries. This map must show the outline of the facility and the following information. (You may submit more than one map if one map does not show the entire area.)

- The area surrounding the treatment plant, including all unit processes.
- The major pipes or other structures through which wastewater enters the treatment works and the pipes or other structures through which treated wastewater is discharged from the treatment plant. Include outfalls from bypass piping, if applicable.
- Each well where wastewater from the treatment plant is injected underground.
- Wells, springs, other surface water bodies, and drinking water wells that are: 1) within 1/4 mile of the property boundaries of the treatment works, and 2) listed in public record or otherwise known to the applicant.
- Any areas where the sewage sludge produced by the treatment works is stored, treated, or disposed.
- If the treatment works receives waste that is classified as hazardous under the Resource Conservation and Recovery Act (RCRA) by truck, rail, or special pipe, show on the map where that hazardous waste enters the treatment works and where it is treated, stored, and/or disposed.

B.3. Process Flow Diagram or Schematic. Provide a diagram showing the processes of the treatment plant, including all bypass piping and all backup power sources or redundancy in the system. Also provide a water balance showing all treatment units, including disinfection (e.g., chlorination and dechlorination). The water balance must show daily average flow rates at influent and discharge points and approximate daily flow rates between treatment units. Include a brief narrative description of the diagram.**B.4. Operation/Maintenance Performed by Contractor(s).**Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of a contractor? ☐ Yes ☐ No

If yes, list the name, address, telephone number, and status of each contractor and describe the contractor's responsibilities (attach additional pages if necessary).

Name: _____

Mailing Address: _____

Telephone Number: _____

Responsibilities of Contractor: _____

B.5. Scheduled Improvements and Schedules of Implementation. Provide information on any uncompleted implementation schedule or uncompleted plans for improvements that will affect the wastewater treatment, effluent quality, or design capacity of the treatment works. If the treatment works has several different implementation schedules or is planning several improvements, submit separate responses to question B.5 for each. (If none, go to question B.6.)

- List the outfall number (assigned in question A.9) for each outfall that is covered by this implementation schedule.

- Indicate whether the planned improvements or implementation schedule are required by local, State, or Federal agencies.
☐ Yes ☐ No

FACILITY NAME AND PERMIT NUMBER:

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- c. If the answer to B.5.b is "Yes," briefly describe, including new maximum daily inflow rate (if applicable).

- d. Provide dates imposed by any compliance schedule or any actual dates of completion for the implementation steps listed below, as applicable. For improvements planned independently of local, State, or Federal agencies, indicate planned or actual completion dates, as applicable. Indicate dates as accurately as possible.

Implementation Stage	Schedule	Actual Completion
	MM / DD / YYYY	MM / DD / YYYY
-- Begin construction	___/___/___	___/___/___
-- End construction	___/___/___	___/___/___
-- Begin discharge	___/___/___	___/___/___
-- Attain operational level	___/___/___	___/___/___

- e. Have appropriate permits/clearances concerning other Federal/State requirements been obtained? ☐ Yes ☐ No

Describe briefly: _____

B.6. EFFLUENT TESTING DATA (GREATER THAN 0.1 MGD ONLY).

Applicants that discharge to waters of the US must provide effluent testing data for the following parameters. Provide the indicated effluent testing required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

Outfall Number: _____

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML / MDL
	Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NONCONVENTIONAL COMPOUNDS.							
AMMONIA (as N)							
CHLORINE (TOTAL RESIDUAL, TRC)							
DISSOLVED OXYGEN							
TOTAL KJELDAHL NITROGEN (TKN)							
NITRATE PLUS NITRITE NITROGEN							
OIL and GREASE							
PHOSPHORUS (Total)							
TOTAL DISSOLVED SOLIDS (TDS)							
OTHER							

END OF PART B.

REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

FACILITY NAME AND PERMIT NUMBER:

Rappahannock Westminster-Canterbury WWTF VA0091511

Form Approved 1/14/99
OMB Number 2040-0086**BASIC APPLICATION INFORMATION****PART C. CERTIFICATION**

All applicants must complete the Certification Section. Refer to instructions to determine who is an officer for the purposes of this certification. All applicants must complete all applicable sections of Form 2A, as explained in the Application Overview. Indicate below which parts of Form 2A you have completed and are submitting. By signing this certification statement, applicants confirm that they have reviewed Form 2A and have completed all sections that apply to the facility for which this application is submitted.

Indicate which parts of Form 2A you have completed and are submitting:

Basic Application Information packet

Supplemental Application Information packet:

☐ Part D (Expanded Effluent Testing Data)☐ Part E (Toxicity Testing: Biomonitoring Data)☐ Part F (Industrial User Discharges and RCRA/CERCLA Wastes)☐ Part G (Combined Sewer Systems)**ALL APPLICANTS MUST COMPLETE THE FOLLOWING CERTIFICATION.**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and official title Stuart A. Bunting, President/CEOSignature Telephone number (804) 438-4003Date signed 8-22-2011

Upon request of the permitting authority, you must submit any other information necessary to assess wastewater treatment practices at the treatment works or identify appropriate permitting requirements.

SEND COMPLETED FORMS TO:

FACILITY NAME AND PERMIT NUMBER:

Form Approved 1/14/99
OMB Number 2040-0086

Rappahannock Westminster-Canterbury WWTF VA0091511

SUPPLEMENTAL APPLICATION INFORMATION

PART D. EXPANDED EFFLUENT TESTING DATA

Refer to the directions on the cover page to determine whether this section applies to the treatment works.

Effluent Testing: 1.0 mgd and Pretreatment Treatment Works. If the treatment works has a design flow greater than or equal to 1.0 mgd or it has (or is required to have) a pretreatment program, or is otherwise required by the permitting authority to provide the data, then provide effluent testing data for the following pollutants. Provide the indicated effluent testing information and any other information required by the permitting authority for each outfall through which effluent is discharged. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analyses conducted using 40 CFR Part 136 methods. In addition, these data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. Indicate in the blank rows provided below any data you may have on pollutants not specifically listed in this form. At a minimum, effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

Outfall number: NA (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
METALS (TOTAL RECOVERABLE), CYANIDE, PHENOLS, AND HARDNESS.											
ANTIMONY										NA	
ARSENIC											
BERYLLIUM											
CADMIUM											
CHROMIUM											
COPPER											
LEAD											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
THALLIUM											
ZINC											
CYANIDE											
TOTAL PHENOLIC COMPOUNDS											
HARDNESS (AS CaCO ₃)											
Use this space (or a separate sheet) to provide information on other metals requested by the permit writer.											

FACILITY NAME AND PERMIT NUMBER:

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Outfall number: NA (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
VOLATILE ORGANIC COMPOUNDS.											
ACROLEIN											
ACRYLONITRILE											
BENZENE											
BROMOFORM											
CARBON TETRACHLORIDE											
CLOROBENZENE											
CHLORODIBROMO-METHANE											
CHLOROETHANE											
2-CHLORO-ETHYL VINYL ETHER											
CHLOROFORM											
DICHLOROBROMO-METHANE											
1,1-DICHLOROETHANE											
1,2-DICHLOROETHANE											
TRANS-1,2-DICHLORO-ETHYLENE											
1,1-DICHLOROETHYLENE											
1,2-DICHLOROPROPANE											
1,3-DICHLORO-PROPYLENE											
ETHYLBENZENE											
METHYL BROMIDE											
METHYL CHLORIDE											
METHYLENE CHLORIDE											
1,1,2,2-TETRACHLORO-ETHANE											
TETRACHLORO-ETHYLENE											
TOLUENE											

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Outfall number: NA (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
1,1,1-TRICHLOROETHANE											
1,1,2-TRICHLOROETHANE											
TRICHLORETHYLENE											
VINYL CHLORIDE											

Use this space (or a separate sheet) to provide information on other volatile organic compounds requested by the permit writer.

--	--	--	--	--	--	--	--	--	--	--	--

ACID-EXTRACTABLE COMPOUNDS

P-CHLORO-M-CRESOL											
2-CHLOROPHENOL											
2,4-DICHLOROPHENOL											
2,4-DIMETHYLPHENOL											
4,6-DINITRO-O-CRESOL											
2,4-DINITROPHENOL											
2-NITROPHENOL											
4-NITROPHENOL											
PENTACHLOROPHENOL											
PHENOL											
2,4,6-TRICHLOROPHENOL											

Use this space (or a separate sheet) to provide information on other acid-extractable compounds requested by the permit writer.

--	--	--	--	--	--	--	--	--	--	--	--

BASE-NEUTRAL COMPOUNDS.

ACENAPHTHENE											
ACENAPHTHYLENE											
ANTHRACENE											
BENZIDINE											
BENZO(A)ANTHRACENE											
BENZO(A)PYRENE											

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Outfall number: NA (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
3,4 BENZO-FLUORANTHENE											
BENZO(GH)PERYLENE											
BENZO(K)FLUORANTHENE											
BIS (2-CHLOROETHOXY) METHANE											
BIS (2-CHLOROETHYL)-ETHER											
BIS (2-CHLOROISO-PROPYL) ETHER											
BIS (2-ETHYLHEXYL) PHTHALATE											
4-BROMOPHENYL PHENYL ETHER											
BUTYL BENZYL PHTHALATE											
2-CHLORONAPHTHALENE											
4-CHLORPHENYL PHENYL ETHER											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
DI-N-OCTYL PHTHALATE											
DIBENZO(A,H) ANTHRACENE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
3,3-DICHLOROBENZIDINE											
DIETHYL PHTHALATE											
DIMETHYL PHTHALATE											
2,4-DINITROTOLUENE											
2,6-DINITROTOLUENE											
1,2-DIPHENYLHYDRAZINE											

FACILITY NAME AND PERMIT NUMBER:

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OMB Number 2040-0086Outfall number: NA (Complete once for each outfall discharging effluent to waters of the United States.)

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
FLUORANTHENE											
FLUORENE											
HEXACHLOROBENZENE											
HEXACHLOROBUTADIENE											
HEXACHLOROCYCLO-PENTADIENE											
HEXACHLOROETHANE											
INDENO(1,2,3-CD)PYRENE											
ISOPHORONE											
NAPHTHALENE											
NITROBENZENE											
N-NITROSODI-N-PROPYLAMINE											
N-NITROSODI- METHYLAMINE											
N-NITROSODI-PHENYLAMINE											
PHENANTHRENE											
PYRENE											
1,2,4-TRICHLOROBENZENE											

Use this space (or a separate sheet) to provide information on other base-neutral compounds requested by the permit writer.

Use this space (or a separate sheet) to provide information on other pollutants (e.g., pesticides) requested by the permit writer.

END OF PART D.**REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE**

FACILITY NAME AND PERMIT NUMBER:

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SUPPLEMENTAL APPLICATION INFORMATION

PART E. TOXICITY TESTING DATA

POTWs meeting one or more of the following criteria must provide the results of whole effluent toxicity tests for acute or chronic toxicity for each of the facility's discharge points: 1) POTWs with a design flow rate greater than or equal to 1.0 mgd; 2) POTWs with a pretreatment program (or those that are required to have one under 40 CFR Part 403); or 3) POTWs required by the permitting authority to submit data for these parameters.

- At a minimum, these results must include quarterly testing for a 12-month period within the past 1 year using multiple species (minimum of two species), or the results from four tests performed at least annually in the four and one-half years prior to the application, provided the results show no appreciable toxicity, and testing for acute and/or chronic toxicity, depending on the range of receiving water dilution. Do not include information on combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136.
- In addition, submit the results of any other whole effluent toxicity tests from the past four and one-half years. If a whole effluent toxicity test conducted during the past four and one-half years revealed toxicity, provide any information on the cause of the toxicity or any results of a toxicity reduction evaluation, if one was conducted.
- If you have already submitted any of the information requested in Part E, you need not submit it again. Rather, provide the information requested in question E.4 for previously submitted information. If EPA methods were not used, report the reasons for using alternate methods. If test summaries are available that contain all of the information requested below, they may be submitted in place of Part E.

If no biomonitoring data is required, do not complete Part E. Refer to the Application Overview for directions on which other sections of the form to complete.

E.1. Required Tests.

Indicate the number of whole effluent toxicity tests conducted in the past four and one-half years.

_____ chronic _____ acute

E.2. Individual Test Data. Complete the following chart for each whole effluent toxicity test conducted in the last four and one-half years. Allow one column per test (where each species constitutes a test). Copy this page if more than three tests are being reported.

Test number: _____ Test number: _____ Test number: _____

a. Test information.

Test species & test method number	NA		
Age at initiation of test			
Outfall number			
Dates sample collected			
Date test started			
Duration			

b. Give toxicity test methods followed.

Manual title			
Edition number and year of publication			
Page number(s)			

c. Give the sample collection method(s) used. For multiple grab samples, indicate the number of grab samples used.

24-Hour composite			
Grab			

d. Indicate where the sample was taken in relation to disinfection. (Check all that apply for each)

Before disinfection			
After disinfection			
After dechlorination			

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Test number: NA

Test number: _____

Test number: _____

e. Describe the point in the treatment process at which the sample was collected.

Sample was collected:

f. For each test, include whether the test was intended to assess chronic toxicity, acute toxicity, or both.

Chronic toxicity

Acute toxicity

g. Provide the type of test performed.

Static

Static-renewal

Flow-through

h. Source of dilution water. If laboratory water, specify type; if receiving water, specify source.

Laboratory water

Receiving water

i. Type of dilution water. If salt water, specify "natural" or type of artificial sea salts or brine used.

Fresh water

Salt water

j. Give the percentage effluent used for all concentrations in the test series.

k. Parameters measured during the test. (State whether parameter meets test method specifications)

pH

Salinity

Temperature

Ammonia

Dissolved oxygen

l. Test Results.

Acute:

Percent survival in 100%
effluent

%

%

%

LC₅₀

95% C.I.

%

%

%

Control percent survival

%

%

%

Other (describe)

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Chronic:

NOEC	%	%	%
IC ₂₅	%	%	%
Control percent survival	%	%	%
Other (describe)			

m. Quality Control/Quality Assurance.

Is reference toxicant data available?			
Was reference toxicant test within acceptable bounds?			
What date was reference toxicant test run (MM/DD/YYYY)?			
Other (describe)			

E.3. Toxicity Reduction Evaluation. Is the treatment works involved in a Toxicity Reduction Evaluation?

____ Yes ____ No If yes, describe: _____

E.4. Summary of Submitted Biomonitoring Test Information. If you have submitted biomonitoring test information, or information regarding the cause of toxicity, within the past four and one-half years, provide the dates the information was submitted to the permitting authority and a summary of the results.

Date submitted: _____ (MM/DD/YYYY)

Summary of results: (see instructions)

_____**END OF PART E.****REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.**

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OMB Number 2040-0086**SUPPLEMENTAL APPLICATION INFORMATION****PART F. INDUSTRIAL USER DISCHARGES AND RCRA/CERCLA WASTES**

All treatment works receiving discharges from significant industrial users or which receive RCRA, CERCLA, or other remedial wastes must complete Part F.

GENERAL INFORMATION:

F.1. Pretreatment Program. Does the treatment works have, or is it subject to, an approved pretreatment program?

____ Yes ☒ No

F.2. Number of Significant Industrial Users (SIUs) and Categorical Industrial Users (CIUs). Provide the number of each of the following types of industrial users that discharge to the treatment works.

- a. Number of non-categorical SIUs. NA
- b. Number of CIUs. NA

SIGNIFICANT INDUSTRIAL USER INFORMATION:

Supply the following information for each SIU. If more than one SIU discharges to the treatment works, copy questions F.3 through F.8 and provide the information requested for each SIU.

F.3. Significant Industrial User Information. Provide the name and address of each SIU discharging to the treatment works. Submit additional pages as necessary.

Name: _____

Mailing Address: _____

F.4. Industrial Processes. Describe all of the industrial processes that affect or contribute to the SIU's discharge.

F.5. Principal Product(s) and Raw Material(s). Describe all of the principal processes and raw materials that affect or contribute to the SIU's discharge.

Principal product(s): _____

Raw material(s): _____

F.6. Flow Rate.

- a. Process wastewater flow rate. Indicate the average daily volume of process wastewater discharged into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent.

_____ gpd (____ continuous or ____ intermittent)

- b. Non-process wastewater flow rate. Indicate the average daily volume of non-process wastewater flow discharged into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent.

_____ gpd (____ continuous or ____ intermittent)

F.7. Pretreatment Standards. Indicate whether the SIU is subject to the following:

- a. Local limits _____ Yes _____ No

- b. Categorical pretreatment standards _____ Yes _____ No

If subject to categorical pretreatment standards, which category and subcategory?

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OMB Number 2040-0086**F.8. Problems at the Treatment Works Attributed to Waste Discharged by the SIU.** Has the SIU caused or contributed to any problems (e.g., upsets, interference) at the treatment works in the past three years?☐ Yes ☐ No If yes, describe each episode.

RCRA HAZARDOUS WASTE RECEIVED BY TRUCK, RAIL, OR DEDICATED PIPELINE:**F.9. RCRA Waste.** Does the treatment works receive or has it in the past three years received RCRA hazardous waste by truck, rail, or dedicated pipe? ☐ Yes ☐ No (go to F.12.)**F.10. Waste Transport.** Method by which RCRA waste is received (check all that apply):☐ Truck ☐ Rail ☐ Dedicated Pipe**F.11. Waste Description.** Give EPA hazardous waste number and amount (volume or mass, specify units).

<u>EPA Hazardous Waste Number</u>	<u>Amount</u>	<u>Units</u>
<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>

CERCLA (SUPERFUND) WASTEWATER, RCRA REMEDIATION/CORRECTIVE ACTION WASTEWATER, AND OTHER REMEDIAL ACTIVITY WASTEWATER:**F.12. Remediation Waste.** Does the treatment works currently (or has it been notified that it will) receive waste from remedial activities?☐ Yes (complete F.13 through F.15.) ☐ No

Provide a list of sites and the requested information (F.13 - F.15.) for each current and future site.

F.13. Waste Origin. Describe the site and type of facility at which the CERCLA/RCRA/or other remedial waste originates (or is expected to originate in the next five years).

F.14. Pollutants. List the hazardous constituents that are received (or are expected to be received). Include data on volume and concentration, if known. (Attach additional sheets if necessary).

F.15. Waste Treatment.

a. Is this waste treated (or will it be treated) prior to entering the treatment works?

☐ Yes ☐ No

If yes, describe the treatment (provide information about the removal efficiency):

b. Is the discharge (or will the discharge be) continuous or intermittent?

☐ Continuous ☐ Intermittent If intermittent, describe discharge schedule.

END OF PART F.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE

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OMB Number 2040-0086**SUPPLEMENTAL APPLICATION INFORMATION****PART G. COMBINED SEWER SYSTEMS****If the treatment works has a combined sewer system, complete Part G.****G.1. System Map.** Provide a map indicating the following: (may be included with Basic Application Information) NA

- a. All CSO discharge points.
- b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems, and outstanding natural resource waters).
- c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in G.1. or on a separate drawing, of the combined sewer collection system that includes the following information:

- a. Locations of major sewer trunk lines, both combined and separate sanitary.
- b. Locations of points where separate sanitary sewers feed into the combined sewer system.
- c. Locations of in-line and off-line storage structures.
- d. Locations of flow-regulating devices.
- e. Locations of pump stations.

CSO OUTFALLS:**Complete questions G.3 through G.6 once for each CSO discharge point.****G.3. Description of Outfall.**

- a. Outfall number NA
- b. Location
(City or town, if applicable) _____ (Zip Code) _____
(County) _____ (State) _____
(Latitude) _____ (Longitude) _____
- c. Distance from shore (if applicable) _____ ft.
- d. Depth below surface (if applicable) _____ ft.
- e. Which of the following were monitored during the last year for this CSO?
____ Rainfall ____ CSO pollutant concentrations ____ CSO frequency
____ CSO flow volume ____ Receiving water quality
- f. How many storm events were monitored during the last year? _____

G.4. CSO Events.

- a. Give the number of CSO events in the last year.
_____ events (____ actual or ____ approx.)
- b. Give the average duration per CSO event.
_____ hours (____ actual or ____ approx.)

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- c. Give the average volume per CSO event.
_____ million gallons (_____ actual or _____ approx.)
- d. Give the minimum rainfall that caused a CSO event in the last year.
_____ inches of rainfall

G.5. Description of Receiving Waters.

- a. Name of receiving water: _____
- b. Name of watershed/river/stream system: _____

United States Soil Conservation Service 14-digit watershed code (if known): _____
- c. Name of State Management/River Basin: _____

United States Geological Survey 8-digit hydrologic cataloging unit code (if known): _____

G.6. CSO Operations.

Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shell fish bed closings, fish kills, fish advisories, other recreational loss, or violation of any applicable State water quality standard).

END OF PART G.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM 2A YOU MUST COMPLETE.

VPDES SEWAGE SLUDGE PERMIT APPLICATION FORM

SCREENING INFORMATION

This application is divided into four sections. Section A pertains to all applicants. The applicability of Sections B, C and D depends on your facility's sewage sludge use or disposal practices. The information provided on this page will help you determine which sections to fill out.

1. All applicants must complete Section A (General Information).

2. Does this facility generate sewage sludge? ☒ Yes ☐ No

Does this facility derive a material from sewage sludge? ☐ Yes ☒ No

If you answered "Yes" to either, complete Section B (Generation Of Sewage Sludge or Preparation Of A Material Derived From Sewage Sludge).

3. Does this facility apply sewage sludge to the land? ☐ Yes ☒ No

Is sewage sludge from this facility applied to the land? ☐ Yes ☒ No

If you answer "No" to all above, skip Section C.

If you answered "Yes" to either, answer the following three questions:

a. Does the sewage sludge from this facility meet the ceiling concentrations, pollutant concentrations, Class A pathogen reduction requirements and one of the vector attraction reduction requirements 1-8, as identified in the instructions?
☐ Yes ☐ No

b. Is sewage sludge from this facility placed in a bag or other container for sale or give-away for application to the land?
☐ Yes ☐ No

c. Is sewage sludge from this facility sent to another facility for treatment or blending? ☐ Yes ☐ No

If you answered "No" to all three, complete Section C (Land Application Of Bulk Sewage Sludge).

If you answered "Yes" to a, b or c, skip Section C.

4. Do you own or operate a surface disposal site? ☐ Yes ☒ No

If "Yes", complete Section D (Surface Disposal).

SECTION A. GENERAL INFORMATION

All applicants must complete this section.

1. Facility Information.

- a. Facility name: Rappahannock Westminster-Canterbury WWTF
- b. Contact person: Stuart Bunting
Title: President/CEO
Phone: (804)438-4003
- c. Mailing address:
Street or P.O. Box: 132 Lancaster Dr.
City or Town: Irvington State: VA Zip: 22480
- d. Facility location:
Street or Route #: 132 Lancaster Dr.
County: Lancaster
City or Town: Irvington State: VA Zip: 22480
- e. Is this facility a Class I sludge management facility? ☐ Yes ☒ No
- f. Facility design flow rate: 0.080 mgd
- g. Total population served: 260 Residents, 200 Employees
- h. Indicate the type of facility:
☐ Publicly owned treatment works (POTW)
☒ Privately owned treatment works
☐ Federally owned treatment works
☐ Blending or treatment operation
☐ Surface disposal site
☐ Other (describe): _____

2. Applicant Information. If the applicant is different from the above, provide the following:

- a. Applicant name: Rappahannock Westminster-Canterbury WWTF
- b. Mailing address:
Street or P.O. Box: 132 Lancaster Dr.
City or Town: Irvington State: VA Zip: 22480
- c. Contact person: Stuart Bunting
Title: President/CEO
Phone: (804)438-4003
- d. Is the applicant the owner or operator (or both) of this facility?
☒ owner ☒ operator
- e. Should correspondence regarding this permit be directed to the facility or the applicant?
☒ facility ☐ applicant

3. Permit Information.

- a. Facility's VPDES permit number (if applicable): VA0091511
- b. List on this form or an attachment, all other federal, state or local permits or construction approvals received or applied for that regulate this facility's sewage sludge management practices:
Permit Number: _____ Type of Permit: _____

FACILITY NAME: Rappahannock Westminster-Canterbury WWTF **VPDES PERMIT NUMBER:** VA0091511

4. **Indian Country.** Does any generation, treatment, storage, application to land or disposal of sewage sludge from this facility occur in Indian Country? _____ Yes X No If "Yes", describe:

5. **Topographic Map.** Provide a topographic map or maps (or other appropriate maps if a topographic map is unavailable) that shows the following information. Maps should include the area one mile beyond all property boundaries of the facility:

- Location of all sewage sludge management facilities, including locations where sewage sludge is generated, stored, treated, or disposed.
- Location of all wells, springs, and other surface water bodies listed in public records or otherwise known to the applicant within 1/4 mile of the property boundaries.

6. **Line Drawing.** Provide a line drawing and/or a narrative description that identifies all sewage sludge processes that will be employed during the term of the permit including all processes used for collecting, dewatering, storing, or treating sewage sludge, the destination(s) of all liquids and solids leaving each unit, and all methods used for pathogen reduction and vector attraction reduction. Permittee will develop a sludge management plan when plans and specifications for the treatment works are finalized.

7. **Contractor Information.** Are any operational or maintenance aspects of this facility related to sewage sludge generation, treatment, use or disposal the responsibility of a contractor? X Yes _____ No

If "Yes", provide the following for each contractor (attach additional pages if necessary).

Name: To Be Determined

Mailing address:

Street or P.O. Box: _____

City or Town: _____ State: _____ Zip: _____

Phone: (_____) _____

Contractor's Federal, State or Local Permit Number(s) applicable to this facility's sewage sludge:

If the contractor is responsible for the use and/or disposal of the sewage sludge, provide a description of the service to be provided to the applicant and the respective obligations of the applicant and the contractor(s).

8. **Pollutant Concentrations.** Using the table below or a separate attachment, provide sewage sludge monitoring data for the pollutants which limits in sewage sludge have been established in 9 VAC 25-31-10 et seq. for this facility's expected use or disposal practices. All data must be based on three or more samples taken at least one month apart and must be no more than four and one-half years old.

POLLUTANT	CONCENTRATION (mg/kg dry weight)	SAMPLE DATE	ANALYTICAL METHOD	DETECTION LEVEL FOR ANALYSIS
Arsenic	NA			
Cadmium				
Chromium				
Copper				
Lead				
Mercury				
Molybdenum				
Nickel				
Selenium				
Zinc				

FACILITY NAME: Rappahannock Westminster-Canterbury WWTF **VPDES PERMIT NUMBER:** VA0091511

9. **Certification.** Read and submit the following certification statement with this application. Refer to the instructions to determine who is an officer for purposes of this certification. Indicate which parts of the application you have completed and are submitting:

 X Section A (General Information)

 X Section B (Generation of Sewage Sludge or Preparation of a Material Derived from Sewage Sludge)

 Section C (Land Application of Bulk Sewage Sludge)

 Section D (Surface Disposal)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name and official title Stuart A. Bunting, President/CEO

Signature  Date Signed 8.22.2011

Telephone number (804) 438-4003

Upon request of the department, you must submit any other information necessary to assess sewage sludge use or disposal practices at your facility or identify appropriate permitting requirements.

SECTION B. GENERATION OF SEWAGE SLUDGE OR PREPARATION
OF A MATERIAL DERIVED FROM SEWAGE SLUDGE

Complete this section if your facility generates sewage sludge or derives a material from sewage sludge

1. Amount Generated On Site.

Total dry metric tons per 365-day period generated at your facility: To be Determined dry metric tons

2. Amount Received from Off Site. If your facility receives sewage sludge from another facility for treatment, use or disposal, provide the following information for each facility from which sewage sludge is received. If you receive sewage sludge from more than one facility, attach additional pages as necessary.

- a. Facility name: NA
- b. Contact Person: _____
Title: _____
Phone: (_____) _____
- c. Mailing address: _____
Street or P.O. Box: _____
City or Town: _____ State: _____ Zip: _____
- d. Facility location: _____
(not P.O. Box) _____
- e. Total dry metric tons per 365-day period received from this facility: _____ dry metric tons
- f. Describe, on this form or on another sheet of paper, any treatment processes known to occur at the off-site facility, including blending activities and treatment to reduce pathogens or vector attraction characteristics:

3. Treatment Provided at Your Facility. To be Determined

- a. Which class of pathogen reduction is achieved for the sewage sludge at your facility?
_____ Class A _____ Class B X Neither or unknown
- b. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce pathogens in sewage sludge: _____

- c. Which vector attraction reduction option is met for the sewage sludge at your facility?
_____ Option 1 (Minimum 38 percent reduction in volatile solids)
_____ Option 2 (Anaerobic process, with bench-scale demonstration)
_____ Option 3 (Aerobic process, with bench-scale demonstration)
_____ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)
_____ Option 5 (Aerobic processes plus raised temperature)
_____ Option 6 (Raise pH to 12 and retain at 11.5)
_____ Option 7 (75 percent solids with no unstabilized solids)
_____ Option 8 (90 percent solids with unstabilized solids)
_____ None or unknown
- d. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce vector attraction properties of sewage sludge: _____

- e. Describe, on this form or another sheet of paper, any other sewage sludge treatment activities, including blending, not identified in a - d above: _____

4. Preparation of Sewage Sludge Meeting Ceiling and Pollutant Concentrations, Class A Pathogen Requirements and One of Vector Attraction Reduction Options 1-8 (EQ Sludge). NA

Yes No

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- ☐ Option 2 (Anaerobic process, with bench-scale demonstration)
☐ Option 3 (Aerobic process, with bench-scale demonstration)
☐ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)
☐ Option 5 (Aerobic processes plus raised temperature)
☐ Option 6 (Raise pH to 12 and retain at 11.5)
☐ Option 7 (75 percent solids with no unstabilized solids)
☐ Option 8 (90 percent solids with unstabilized solids)
☐ None unknown

Describe, on this form or another sheet of paper, any treatment processes used at the receiving facility to reduce vector attraction properties of sewage sludge: _____

- h. Does the receiving facility provide any additional treatment or blending not identified in f or g above?
☐ Yes ☐ No

If "Yes", describe, on this form or another sheet of paper, the treatment processes not identified in f or g above: _____

- i. If you answered "Yes" to f, g or h above, attach a copy of any information you provide to the receiving facility to comply with the "notice and necessary information" requirement of 9 VAC 25-31-530.G.
- j. Does the receiving facility place sewage sludge from your facility in a bag or other container for sale or give-away for application to the land? ☐ Yes ☐ No

If "Yes", provide a copy of all labels or notices that accompany the product being sold or given away.

- k. Will the sewage sludge be transported to the receiving facility in a truck-mounted watertight tank normally used for such purposes? ☐ Yes ☐ No. If "No", provide description and specification on the vehicle used to transport the sewage sludge to the receiving facility.

Show the haul route(s) on a location map or briefly describe the haul route below and indicate the days of the week and the times of the day sewage sludge will be transported.

7. Land Application of Bulk Sewage Sludge. NA

(Complete Question 7.a if sewage sludge from your facility is applied to the land, unless the sewage sludge is covered in Questions 4, 5 or 6. Complete Question 7.b, c & d only if you are responsible for land application of sewage sludge.)

- a. Total dry metric tons per 365-day period of sewage sludge applied to all land application sites:

_____ dry metric tons

- b. Do you identify all land application sites in Section C of this application? ☐ Yes ☐ No

If "No", submit a copy of the Land Application Plan (LAP) with this application (LAP should be prepared in accordance with the instructions).

- c. Are any land application sites located in States other than Virginia? ☐ Yes ☐ No

If "Yes", describe, on this form or on another sheet of paper, how you notify the permitting authority for the States where the land application sites are located. Provide a copy of the notification.

- d. Attach a copy of any information you provide to the owner or lease holder of the land application sites to comply with the "notice and necessary" information requirement of 9 VAC 25-31-530 F and/or H (Examples may be obtained in Appendix IV).

8. Surface Disposal. NA

(Complete Question 8 if sewage sludge from your facility is placed on a surface disposal site.)

a. Total dry metric tons per 365-day period of sewage sludge from your facility placed on all surface disposal sites: _____ dry metric tons

b. Do you own or operate all surface disposal sites to which you send sewage sludge for disposal?
_____ Yes _____ No

If "No", answer questions c - g for each surface disposal site that you do not own or operate. If you send sewage sludge to more than one surface disposal site, attach additional pages as necessary.

c. Site name or number: _____

d. Contact person: _____

Title: _____

Phone: (_____) _____

Contact is: _____ Site Owner _____ Site operator

e. Mailing address:

Street or P.O. Box: _____

City or Town: _____ State: _____ Zip: _____

f. Total dry metric tons per 365-day period of sewage sludge from your facility placed on this surface disposal site: _____ dry metric tons

g. List, on this form or an attachment, the surface disposal site VPDES permit number as well as the numbers of all other federal, state or local permits that regulate the sewage sludge use or disposal practices at the surface disposal site:

Permit Number: _____ Type of Permit: _____

9. Incineration. NA

(Complete Question 9 if sewage sludge from your facility is fired in a sewage sludge incinerator.)

a. Total dry metric tons per 365-day period of sewage sludge from your facility fired in a sewage sludge incinerator: _____ dry metric tons

b. Do you own or operate all sewage sludge incinerators in which sewage sludge from your facility is fired?
_____ Yes _____ No

If "No", answer questions c - g for each sewage sludge incinerator that you do not own or operate. If you send sewage sludge to more than one sewage sludge incinerator, attach additional pages as necessary.

c. Incinerator name or number: _____

d. Contact person: _____

Title: _____

Phone: (_____) _____

Contact is: _____ Incinerator Owner _____ Incinerator Operator

e. Mailing address:

Street or P.O. Box: _____

City or Town: _____ State: _____ Zip: _____

f. Total dry metric tons per 365-day period of sewage sludge from your facility fired in this sewage sludge incinerator: _____ dry metric tons

g. List on this form or an attachment the numbers of all other federal, state or local permits that regulate the firing

of sewage sludge at this incinerator:

Permit Number: _____

Type of Permit: _____

10. Disposal in a Municipal Solid Waste Landfill. NA

(Complete Question 10 if sewage sludge from your facility is placed on a municipal solid waste landfill. Provide the following information for each municipal solid waste landfill on which sewage sludge from your facility is placed. If sewage sludge is placed on more than one municipal solid waste landfill, attach additional pages as necessary.)

- a. Landfill name: _____
- b. Contact person: _____
Title: _____
Phone: (_____) _____
Contact is: _____ Landfill Owner _____ Landfill Operator
- c. Mailing address:
Street or P.O. Box: _____
City or Town: _____ State: _____ Zip: _____
- d. Landfill location:
Street or Route #: _____
County: _____
City or Town: _____ State: _____ Zip: _____
- e. Total dry metric tons per 365-day period of sewage sludge placed in this municipal solid waste landfill:
_____ dry metric tons
- f. List, on this form or an attachment, the numbers of all federal, state or local permits that regulate the operation of this municipal solid waste landfill:
Permit Number: _____ Type of Permit: _____

- g. Does sewage sludge meet applicable requirements in the Virginia Solid Waste Management Regulation, 9 VAC 20-80-10 et seq., concerning the quality of materials disposed in a municipal solid waste landfill?
_____ Yes _____ No
- h. Does the municipal solid waste landfill comply with all applicable criteria set forth in the Virginia Solid Waste Management Regulation, 9 VAC 20-80-10 et seq.? _____ Yes _____ No
- i. Will the vehicle bed or other container used to transport sewage sludge to the municipal solid waste landfill be watertight and covered? _____ Yes _____ No
Show the haul route(s) on a location map or briefly describe the route below and indicate the days of the week and time of the day sewage sludge will be transported.

SECTION C. LAND APPLICATION OF BULK SEWAGE SLUDGE

Complete this section for sewage sludge that is land applied unless any of the following conditions apply:

- The sewage sludge meets the Table 1 ceiling concentrations, the Table 3 pollutant concentrations, Class A pathogen requirements and one of the vector attraction reduction options 1-8 (fill out B.4 instead) (EQ Sludge); or
- The sewage sludge is sold or given away in a bag or other container for application to the land (fill out B.5 instead); or
- You provide the sewage sludge to another facility for treatment or blending (fill out B.6 instead).

Complete Section C for every site on which the sewage sludge that you reported in B.7 is land applied.

1. Identification of Land Application Site. NA

- Site name or number: _____
- Site location (Complete i and ii)
 - Street or Route#: _____
County: _____
City or Town: _____ State: _____ Zip: _____
 - Latitude: _____ Longitude: _____
Method of latitude/longitude determination
____ USGS map _____ Filed survey _____ Other _____
- Topographic map. Provide a topographic map (or other appropriate map if a topographic map is unavailable) that shows the site location.

2. Owner Information. NA

- Are you the owner of this land application site? _____ Yes _____ No
- If "No", provide the following information about the owner:
Name: _____
Street or P.O. Box: _____
City or Town: _____ State: _____ Zip: _____
Phone: (_____) _____

3. Applier Information: NA

- Are you the person who applies, or who is responsible for application of, sewage sludge to this land application site?
_____ Yes _____ No
- If "No", provide the following information for the person who applies the sewage sludge:
Name: _____
Street or P.O. Box: _____
City or Town: _____ State: _____ Zip: _____
Phone: (_____) _____
- List, on this form or an attachment, the numbers of all federal, state or local permits that regulate the person who applies sewage sludge to this land application site:
Permit Number: _____ Type of Permit: _____

4. Site Type. Identify the type of land application site from among the following: NA

- _____ Agricultural land _____ Reclamation site _____ Forest
_____ Public contact site _____ Other (describe _____)

5. Vector Attraction Reduction. NA

Are any vector attraction reduction requirements met when sewage sludge is applied to the land application site?

_____ Yes _____ No If "Yes", answer a and b.

a. Indicate which vector attraction reduction option is met:

_____ Option 9 (Injection below land surface)

_____ Option 10 (Incorporation into soil within 6 hours)

b. Describe, on this form or on another sheet of paper, any treatment processes used at the land application site to reduce the vector attraction properties of sewage sludge:

6. Cumulative Loadings and Remaining Allotments. NA

(Complete Question 6 only if the sewage sludge applied to this site since July 20, 1993 is subject to the cumulative pollutant loading rates (CPLRs) - see instructions.)

a. Have you contacted DEQ or the permitting authority in the state where the sewage sludge subject to the CPLRs will be applied to ascertain whether bulk sewage sludge subject to the CPLRs has been applied to this site since July 20, 1993? _____ Yes _____ No

If "No", sewage sludge subject to the CPLRs may not be applied to this site.

If "Yes", provide the following information:

Permitting authority: _____

Contact person: _____

Phone: (_____) _____

b. Based upon this inquiry, has bulk sewage sludge subject to the CPLRs been applied to this site since July 20, 1993? _____ Yes _____ No If "No", skip the rest of Question 6. If "Yes", answer questions c - e.

c. Site size, in hectares: _____ (one hectare = 2.471 acres)

d. Provide the following information for every facility other than yours that is sending or has sent sewage sludge subject to the CPLRs to this site since July 20, 1993. If more than one such facility sends sewage sludge to this site, attach additional pages as necessary.

Facility name: _____

Facility contact: _____

Title: _____

Phone: (_____) _____

Mailing address.

Street or P.O. Box: _____

City or Town: _____ State: _____ Zip: _____

e. Provide the total loading and allotment remaining, in kg/hectare, for each of the following pollutants:

	Cumulative loading	Allotment remaining
Arsenic	_____	_____
Cadmium	_____	_____
Copper	_____	_____
Lead	_____	_____
Mercury	_____	_____
Nickel	_____	_____
Selenium	_____	_____
Zinc	_____	_____

Complete Questions 7-12 below only if you apply sewage sludge, or you are responsible for land application of sewage sludge. Information required by these questions may be prepared as attachments to this form. Skip the following questions if you contract land application to someone else (as indicated under Section A.7) who is responsible for the operation.

- 7. Sludge Characterization.** Use the table below or a separate attachment, provide at least one analysis for each parameter. NA

PCBs (mg/kg)	_____
pH (S. U.)	_____
Percent Solids (%)	_____
Ammonium Nitrogen (mg/kg)	_____
Nitrate Nitrogen (mg/kg)	_____
Total Kjeldahl Nitrogen (mg/kg)	_____
Total Phosphorus (mg/kg)	_____
Total Potassium (mg/kg)	_____
Alkalinity as CaCO ₃ * (mg/kg)	_____

* Lime treated sludge (10% or more lime by dry weight) should be analyzed for percent CaCO₃.

- 8. Storage Requirements.** NA

Existing and proposed sludge storage facilities must provide an estimated annual sludge balance on a monthly basis incorporating such factors as storage capacity, sludge production and land application schedule. Include pertinent calculations justifying storage requirements.

Proposed sludge storage facilities must also provide the following information:

- a. A sludge storage site layout on a 7.5 minute topographic quadrangle or other appropriate scaled map to show the following topographic features of the surrounding landscape to a distance of 0.25 mile. Clearly mark the property line.
 - 1) Water wells, abandoned or operating
 - 2) Surface waters
 - 3) Springs
 - 4) Public water supply(s)
 - 5) Sinkholes
 - 6) Underground and/or surface mines
 - 7) Mine pool (or other) surface water discharge points
 - 8) Mining spoil piles and mine dumps
 - 9) Quarry(s)
 - 10) Sand and gravel pits
 - 11) Gas and oil wells
 - 12) Diversion ditch(s)
 - 13) Agricultural drainage ditch(s)
 - 14) Occupied dwellings, including industrial and commercial establishments
 - 15) Landfills or dumps
 - 16) Other unlined impoundments
 - 17) Septic tanks and drainfields
 - 18) Injection wells
 - 19) Rock outcrops
- b. A topographic map of sufficient detail to clearly show the following information:
 - 1) Maximum and minimum percent slopes
 - 2) Depressions on the site that may collect water
 - 3) Drainageways that may attribute to rainfall run-on to or runoff from this site
 - 4) Portions of the site (if any) which are located with the 100-year floodplain and how the storage facility will be protected from flooding
- c. Data and specifications for the storage facility lining material.
- d. Plan and cross-sectional views of the storage facility.
- e. Depth from the bottom of the storage facility to the seasonal high water table and separation distance to the permanent water table.

- 9. Land Area Requirements.** Provide calculations justifying the land area requirements for land application of sewage

sludge taking into consideration average soil productivity group, crop(s) to be grown and most limiting factor(s) of the sewage sludge, specifically Plant Available Nitrogen (PAN), Calcium Carbonate Equivalence (CCE), and metal loadings (CPLR sewage sludge only), where applicable. Relate PAN, CCE, and metal loadings to demonstrate the most limiting factor for land application. NA

- 10. Landowner Agreement Forms.** Provide a properly completed Sewage Sludge Application Agreement Form (attached) for each landowner if sewage sludge is to be applied onto land not owned by the applicant. NA

- 11. Ground Water Monitoring.** NA

Are any ground water monitoring data available for this land application site? Yes No

If "Yes", submit the ground water monitoring data with this permit application. Also submit a written description of the well locations, approximate depth to ground water, and the ground water monitoring procedures used to obtain these data.

- 12. Land Application Site Information.** NA

(Complete Items a-d for sites receiving infrequent application - land application of sewage sludge up to the agronomic rate at a frequency of once in a 3 year period; complete Items a-h for sites receiving frequent application - land application of sewage sludge in excess of 70% the agronomic rate at a frequency greater than once in a 3 year period)

- a. Provide a general location map for each county which clearly indicates the location of all the land application sites.
- b. For each land application site provide a site plan of sufficient detail to clearly show the concerned landscape features and associated buffer zones (See instructions). Provide a legend for each landscape feature and the net acreage for each field taking into account the proposed buffer zones.
- c. In order to ensure that land application of bulk sewage sludge will not impact federally listed threatened or endangered species or federally designated critical habitat, the applicant must notify the field office of the U. S. Department of the Interior, Fish and Wildlife Service (FWS), by a letter, the proposed land application activities with the identification of the land application sites. The address and phone number of FWS are provided below.

U.S. Fish and Wildlife Service
Virginia Field Office
P.O. Box 480
White Marsh, VA 23183
TEL: (804) 693-6694

Provide a copy of the notification letter with this application form.

- d. Provide a soil survey map, preferably photographically based, with the field boundaries clearly marked. (A USDA-SCS soil survey map should be provided, if available.)

Provide a detailed legend for each soil survey map which uses accepted USDA-SCS descriptions of the typifying pedon for each soil series (soil type). Complex associations may be described as a range of characteristics. Soil descriptions shall include as a minimum the following information.

- 1) Soil symbol
- 2) Soil series, textural phase and slope range
- 3) Depth to seasonal high water table
- 4) Depth to bedrock
- 5) Estimated soil productivity group (for the proposed crop rotation)

Item e - h are required for sites receiving frequent application of sewage sludge

- e. In order to verify the information provided in item d, characterize the soil at each land application site. Representative soil borings or test pits to a depth of five feet or to bedrock if shallower, are to be coordinated for the typifying pedon of each soil series (soil type). Soil descriptions shall include as a minimum the following information:

- 1) Soil symbol
- 2) Soil series, textural phase and slope range
- 3) Depth to seasonal high water table
- 4) Depth to bedrock
- 5) Estimated soil productivity group (for the proposed crop rotation)

- f. Collect and analyze soil samples from each field, weighted to best represent each of the soil borings performed for Item e. Using the table below or a separate attachment, provide at least one analysis per sample for each of the

following parameters.

Soil Organic Matter (%)	_____
Soil pH (std. units)	_____
Cation Exchange Capacity (meq/100g)	_____
Total Nitrogen (ppm)	_____
Organic Nitrogen (ppm)	_____
Ammonia Nitrogen (ppm)	_____
Nitrate Nitrogen (ppm)	_____
Available Phosphorus (ppm)	_____
Exchangeable Potassium (mg/100g)	_____
Exchangeable Sodium (mg/100g)	_____
Exchangeable Calcium (mg/100g)	_____
Exchangeable Magnesium (mg/100g)	_____
Arsenic (ppm)	_____
Cadmium (ppm)	_____
Copper (ppm)	_____
Lead (ppm)	_____
Mercury (ppm)	_____
Molybdenum (ppm)	_____
Nickel (ppm)	_____
Selenium (ppm)	_____
Zinc (ppm)	_____
Manganese (ppm)	_____
Particle Size Analysis or USDA Textural Estimate (%)	_____

- g. Relate the crop nutrient needs to anticipated yields, soil productivity rating and the various fertilizer or nutrient sources from sludge and chemical fertilizers. Describe any specialized agronomic management practices which may be required as a result of high soil pH. If the sludge is expected to possess an unusually high CCE or other unusual properties, provide a description of any plant tissue testing, supplemental fertilization or intensive agronomic management practices which may be necessary.
- h. Using a narrative format and referencing any related charts, describe the proposed cropping system. Show how the crop rotation and management will be coordinated with the design of the land application system. Include any supplemental fertilization program, soil testing and the coordination of tillage practices, planting and harvesting schedules and timing of land application.

SEWAGE SLUDGE APPLICATION AGREEMENT

This sewage sludge application agreement is made on this date N/A between _____, referred to here as "landowner", and _____, referred to here as the "Permittee".

Landowner is the owner of agricultural land shown on the map attached as Exhibit A and designated there as _____ ("landowner's land"). Permittee agrees to apply and landowner agrees to comply with certain permit requirements following application of sewage sludge on landowner's land in amounts and in a manner authorized by VPDES permit number _____ which is held by the Permittee.

Landowner acknowledges that the appropriate application of sewage sludge will be beneficial in providing fertilizer and soil conditioning to the property. Moreover, landowner acknowledges having been expressly advised that, in order to protect public health, the following site restrictions must be adhered to when sewage sludge receives Class B treatment for pathogen reduction:

1. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge;
2. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for four months or longer prior to incorporation into the soil;
3. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than four months prior to incorporation into the soil;
4. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge;
5. Animals shall not be grazed on the land for 30 days after application of sewage sludge;
6. Turf grown on land where sewage sludge is applied shall not be harvested for one year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the State Water Control Board;
7. Public access to land with a high potential for public exposure shall be restricted for one year after application of sewage sludge;
8. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.
9. Tobacco, because it has been shown to accumulate cadmium, should not be grown on landowner's land for three years following the application of sewage sludge borne cadmium equal to or exceeding 0.5 kilograms/hectare (0.45 pounds/acre).


Permittee agrees to notify landowner or landowner's designee of the proposed schedule for sewage sludge application and specifically prior to any particular application to landowner's land. This agreement may be terminated by either party upon written notice to the address specified below.

Landowner:

Signature

Mailing Address

Permittee:


Signature

132 Lancaster Dr. Lexington VA 22480
Mailing Address

SECTION D. SURFACE DISPOSAL

Complete this section only if you own or operate a surface disposal site. Provide the information for each active sewage sludge unit.

1. Information on Active Sewage Sludge Units.

- a. Unit name or number: NA
- b. Unit location
- i. Street or Route#: _____
County: _____
City or Town: _____ State: _____ Zip: _____
- ii. Latitude: _____ Longitude: _____
Method of latitude/longitude determination
____ USGS map ____ Filed survey ____ Other
- c. Topographic map. Provide a topographic map (or other appropriate map if a topographic map is unavailable) that shows the site location.
- d. Total dry metric tons of sewage sludge placed on the active sewage sludge unit per 365-day period:
_____ dry metric tons.
- e. Total dry metric tons of sewage sludge placed on the active sewage sludge unit over the life of the unit:
_____ dry metric tons.
- f. Does the active sewage sludge unit have a liner with a minimum hydraulic conductivity of 1×10^{-7} cm/sec?
____ Yes ____ No If "Yes", describe the liner or attach a description.

- g. Does the active sewage sludge unit have a leachate collection system? ____ Yes ____ No
If "Yes", describe the leachate collection system or attach a description. Also, describe the method used for leachate disposal and provide the numbers of any federal, state or local permits for leachate disposal:

- h. If you answered "No" to either f or g, answer the following:
Is the boundary of the active sewage sludge unit less than 150 meters from the property line of the surface disposal site? ____ Yes ____ No If "Yes", provide the actual distance in meters: _____
- i. Remaining capacity of active sewage sludge unit, in dry metric tons: _____ dry metric tons
Anticipated closure date for active sewage sludge unit, if known: _____ (MM/DD/YYYY)
Provide with this application a copy of any closure plan developed for this active sewage sludge unit.

2. Sewage Sludge from Other Facilities.

Is sewage sludge sent to this active sewage sludge unit from any facilities other than yours? NA Yes ____ No ____
If "Yes", provide the following information for each such facility, attach additional sheets as necessary.

- a. Facility name: _____
- b. Facility contact: _____
Title: _____
Phone: (_____) _____
- c. Mailing address:
Street or P.O. Box: _____
City or Town: _____ State: _____ Zip: _____

- d. List, on this form or an attachment, the facility's VPDES permit number as well as the numbers of all other federal, state or local permits that regulate the facility's sewage sludge management practices:

Permit Number:

Type of Permit:

- e. Which class of pathogen reduction is achieved before sewage sludge leaves the other facility?

____ Class A ____ Class B ____ Neither or unknown

- f. Describe, on this form or on another sheet of paper, any treatment processes used at the other facility to reduce pathogens in sewage sludge: _____

- g. Which vector attraction reduction option is achieved before sewage sludge leaves the other facility?

____ Option 1 (Minimum 38 percent reduction in volatile solids)

____ Option 2 (Anaerobic process, with bench-scale demonstration)

____ Option 3 (Aerobic process, with bench-scale demonstration)

____ Option 4 (Specific oxygen uptake rate for aerobically digested sludge)

____ Option 5 (Aerobic processes plus raised temperature)

____ Option 6 (Raise pH to 12 and retain at 11.5)

____ Option 7 (75 percent solids with no unstabilized solids)

____ Option 8 (90 percent solids with unstabilized solids)

____ None or unknown

- h. Describe, on this form or another sheet of paper, any treatment processes used at the other facility to reduce vector attraction properties of sewage sludge: _____

- i. Describe, on this form or another sheet of paper, any other sewage sludge treatment activities performed by the other facility that are not identified in e - h above: _____

3. Vector Attraction Reduction.

- a. Which vector attraction reduction option, if any, is met when sewage sludge is placed on this active sewage sludge unit?

NA Option 9 (Injection below land surface)

____ Option 10 (Incorporation into soil within 6 hours)

____ Option 11 (Covering active sewage sludge unit daily)

- b. Describe, on this form or another sheet of paper, any treatment processes used at the active sewage sludge unit to reduce vector attraction properties of sewage sludge: _____

4. Ground Water Monitoring.

- a. Is ground water monitoring currently conducted at this active sewage sludge unit or are ground water monitoring data otherwise available for this active sewage sludge unit? NA Yes ____ No

If "Yes", provide a copy of available ground water monitoring data. Also provide a written description of the well locations, the approximate depth to ground water, and the ground water monitoring procedures used to obtain these

FACILITY NAME: Rappahannock Westminster-Canterbury WWTF **VPDES PERMIT NUMBER:** VA0091511

data.

- b. Has a ground water monitoring program been prepared for this active sewage sludge unit?
_____ Yes _____ No If "Yes", submit a copy of the ground water monitoring program with this application.
- c. Have you obtained a certification from a qualified ground water scientist that the aquifer below the active sewage sludge unit has not been contaminated? _____ Yes _____ No

If "Yes", submit a copy of the certification with this application.

5. Site-Specific Limits.

Are you seeking site-specific pollutant limits for the sewage sludge placed on the active sewage sludge unit?

_____ Yes _____ No If "Yes", submit information to support the request for site-specific pollutant limits with this application.

VPDES Permit Application Addendum

1. **Entity to whom the permit is to be issued:** Rappahannock Westminster-Canterbury, Inc.

Who will be legally responsible for the wastewater treatment facilities and compliance with the permit? This may or may not be the facility or property owner.

2. **Is this facility located within city or town boundaries?** Yes ☐ No ☒

3. **Provide the tax map parcel number for the land where the discharge is located.** 28-204

4. **For the facility to be covered by this permit, how many acres will be disturbed during the next five years due to new construction activities?** ± 10

5. **What is the design average effluent flow of this facility?** .080 MGD

For industrial facilities, provide the max. 30-day average production level, include units:

In addition to the design flow or production level, should the permit be written with limits for any other discharge flow tiers or production levels? Yes ☐ No ☒

If "Yes", please identify the other flow tiers (in MGD) or production levels:

Please consider the following questions for both the flow tiers and the production levels (if applicable): Do you plan to expand operations during the next five years? Is your facility's design flow considerably greater than your current flow?

6. **Nature of operations generating wastewater:**

Continuing Care Retirement Community

100 % of flow from domestic connections/sources

Number of private residences to be served by the treatment works: 152

 % of flow from non-domestic connections/sources

7. **Mode of discharge:** ☒ Continuous ☐ Intermittent ☐ Seasonal

Describe frequency and duration of intermittent or seasonal discharges:

Wastewater Treatment Plant has not been constructed.

8. **Identify the characteristics of the receiving stream at the point just above the facility's discharge point:**

 Permanent stream, never dry

X Intermittent stream, usually flowing, sometimes dry

 Ephemeral stream, wet-weather flow, often dry

 Effluent-dependent stream, usually or always dry without effluent flow

 Lake or pond at or below the discharge point

 Other:

9. **Approval Date(s):**

Original: 6/4/1985

O & M Manual Added: 6/22/1994 **Sludge/Solids Management Plan** NA

Have there been any changes in your operations or procedures since the above approval dates? Yes ☐ No ☒

PUBLIC NOTICE BILLING INFORMATION

I hereby authorize the Department of Environmental Quality to have the cost of publishing a public notice billed to the Agent/Department shown below. The public notice will be published once a week for two consecutive weeks in Rappahannock Record in accordance with 9 VAC 25-31-290.C.2.

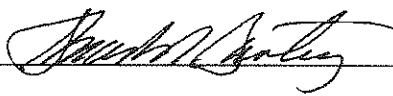
Agent/Department to be billed:

Owner: Rappahannock Westminster-Canterbury

Agent/Department Address: 132 Lancaster Dr
Irvington, VA 22480

Agent's Telephone No.: 804-438-4003

Printed Name: STUART A. BUNTING

Authorizing Agent – Signature: 

Date: 8.22.2011

VIRGINIA POLLUTION ABATEMENT
PERMIT RENEWAL APPLICATION
RAPPAHANNOCK
WESTMINSTER-CANTERBURY
WASTEWATER TREATMENT FACILITY
VPA PERMIT # VA0091511

**VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION
FORM A
ALL APPLICANTS**

1. Facility	Name	Rappahannock Westminster-Canterbury WWTF
	County/City	Lancaster
	Address	132 Lancaster Dr. Irvington, VA 22480
2. Owner	Legal Name	Rappahannock Westminster-Canterbury, Inc.
	Mailing Address	132 Lancaster Dr. Irvington, VA 22480
	Telephone Number	804-438-4000
	Email address	sbunting@rw-c.org
3. Owner Contact	Name	Stuart Bunting
	Title	President/CEO
	Mailing Address	132 Lancaster Dr. Irvington, VA 22480
	Telephone Number	804-438-4003
	Email address	sbunting@rw-c.org

4. Existing permits (e.g., VPA, VPDES; VWP, RCRA; UIC); other:

Agency	Permit Type	Permit Number
DEQ	VPDES	VA0091511

5. Nature of Business: 8361

SIC Code(s):			
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6. Type of Waste:

(check box as appropriate)

Proposed

Existing

Animal Waste (complete Form B)

☐
☐

Industrial Waste (complete Form C)

☐
☐

Land Application of Municipal Effluent
(complete Form D, Part I)

☐
☒

Land Application of Biosolids/Sewage Sludge
(complete Form D, Part II)

☐
☐

Reclamation and/or Distribution of Reclaimed
Wastewater (Application Addendum)

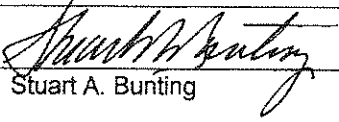
☐
☐

7. General Location Map:

Provide a general location map which clearly identifies the location of the facility

**VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION
FORM A
ALL APPLICANTS**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. I further certify that I am an authorized signatory as specified in the VPA Permit Regulation (9VAC25-32).

Signature:		Date:	8.22.2011
Printed Name:	Stuart A. Bunting		
Title:	President/CEO		

VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION

FORM D

MUNICIPAL WASTE

PART D-1 LAND APPLICATION OF EFFLUENT

Note: Numbered paragraphs conform to Part D-1 Instructions

GENERAL INFORMATION

1. Facility Name: Rappahannock Westminster-Canterbury WWTF
2. The facility handles domestic wastewater from a life care/retirement complex. The design is based on an average design flow of 50,000 gpd, a peak flow of 175,000 gpd, BOD5 loading of 249 mg/l and SS loading of 240 mg/l. Permitted monthly average limits are 48 mg/l BOD5 and 29.82 mg/l SS.

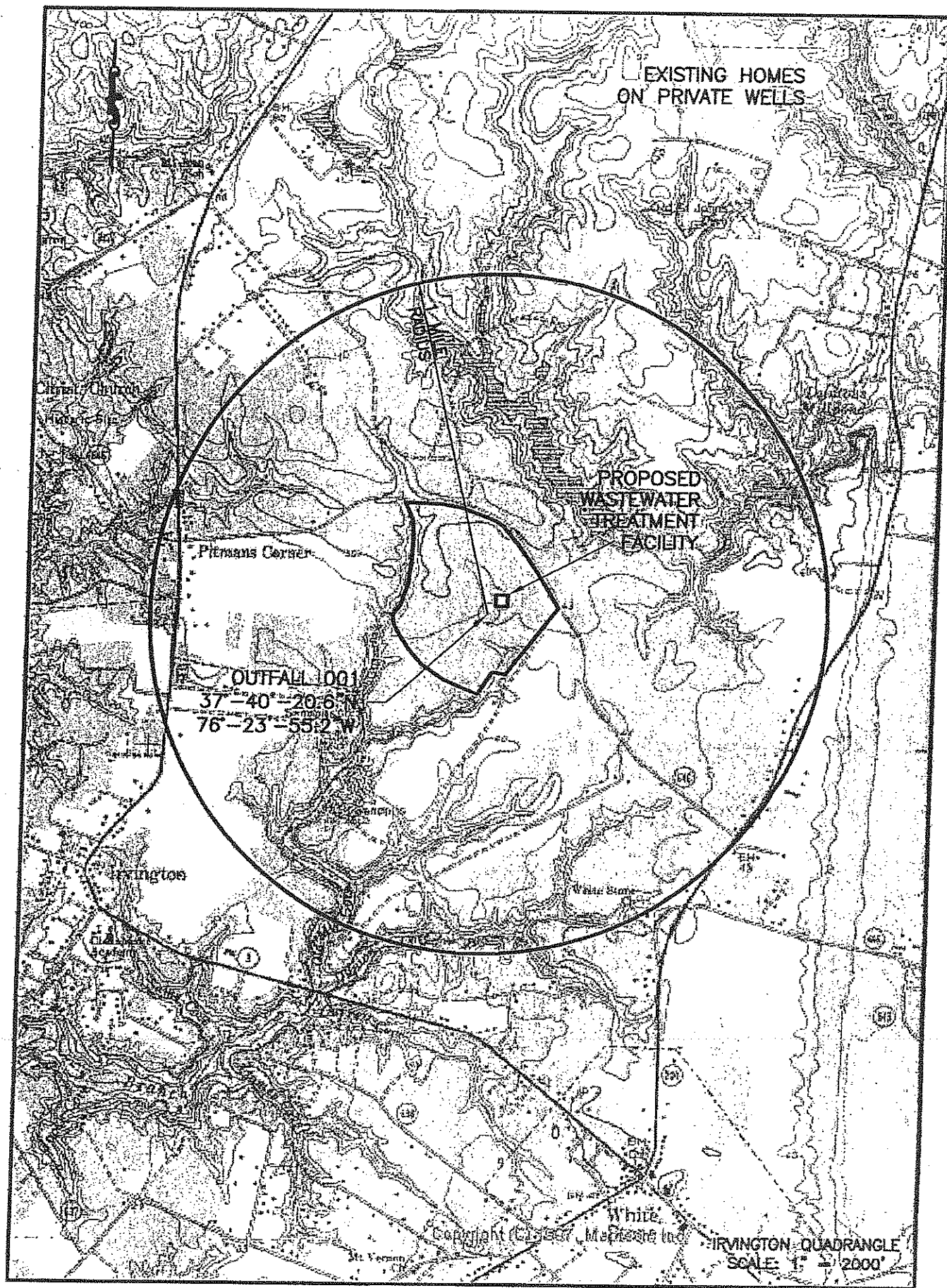
The process consists of a pump station from the residential facility which pumps to Cell 1 of the lagoon system. Flow from Cell 1 flows to Cell 2 in series. Both cells are aerated by blowers and submerged diffusers. They provide 30 days detention. The flow passes through an outlet structure into Cell 3 and then to Cell 4 in series. These cells are used for storage of the treated effluent. Detention of up to 85 days is provided. Effluent from the storage Cell 4 enters a Chlorine Contact Tank for chlorination. Distribution pumps transfer the chlorinated effluent to the sprinklers at the land application fields. The 2010 average daily flow of 26,197 gal. is through all units and land applied except the amount lost to evaporation. A more complete description is contained in the Operation & Maintenance Manual in Section 1.3.4. A line drawing of the flow schematic is enclosed. It is taken from the Operation and Maintenance manual.

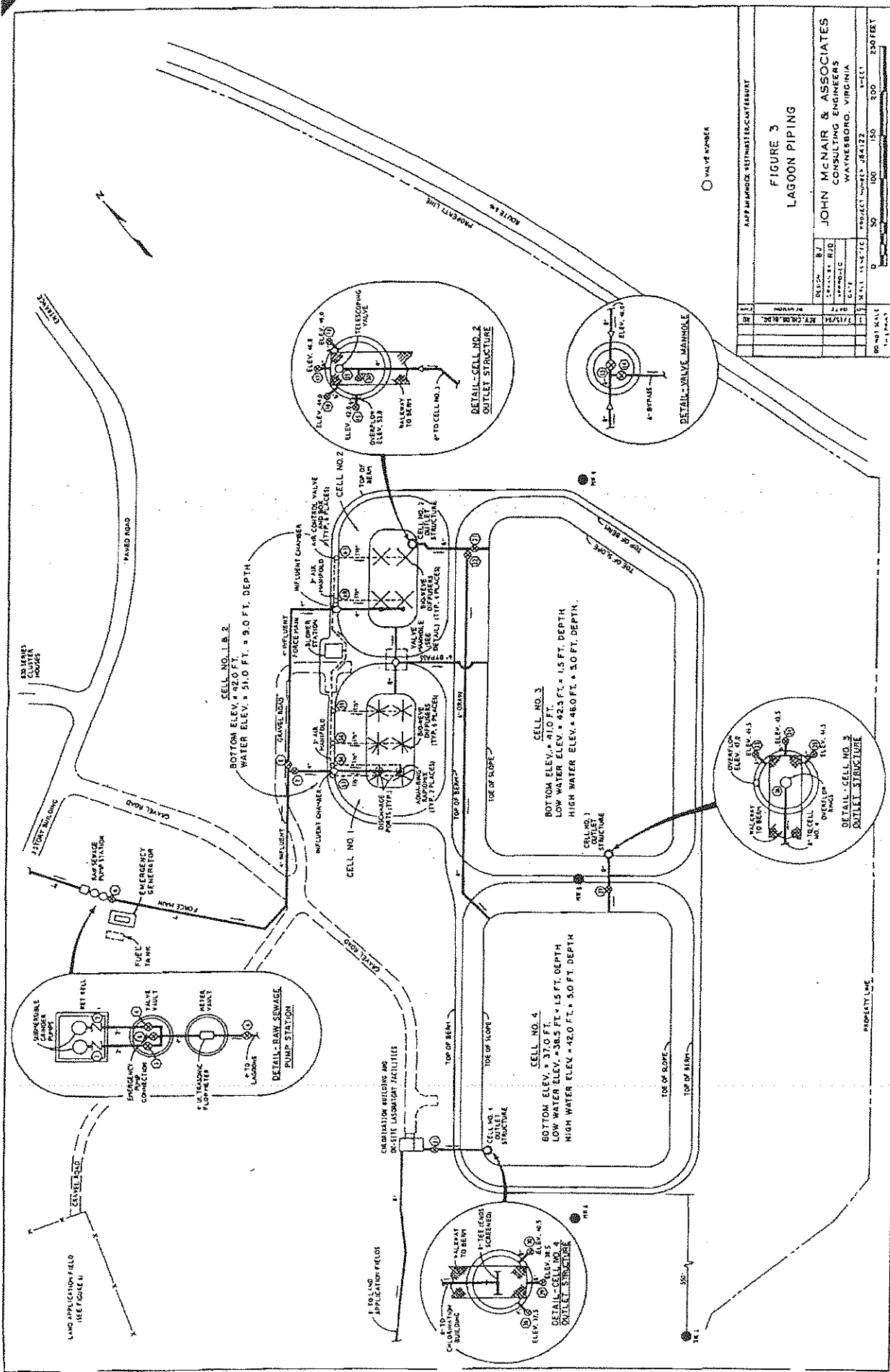
3. Sludge disposal: The aerated sludge lagoons provide internal sludge digestion. Additional sludge treatment facilities are not required. Non-degradable materials will accumulate at unpredictable rates. When these deposits accumulate to the point that they affect operation or treatment efficiency, they must be removed. Time for removal will be determined by observation. The sludge will be disposed of by an appropriate method.
4. There are no industrial contributors to the wastewater facilities.
5. The treatment works and application fields are owned and operated by the applicant.
6. A copy of the Certificate of Incorporation from the Virginia Corporation Commission is enclosed.

calculated for the 2007 permit. Potassium is calculated to be 104.59 lb/acre with no limit and was not monitored prior to the 2007 permit. Metals (cadmium, copper, lead, and nickel) are below detectable limits and zinc is calculated to be 0.19 lb/acre. All metals are below limits cited in the 2007 permit taken from Table 6.6 (Recommended Limits for Metals Allowed on Agricultural Land, No Discharge Certificate Manual, 1981, SWCB: Cd 4.45 lb/acre; Cu 111 lb/acre; Pb 445 lb/acre; Ni: 44 lb/acre; Zn 222 lb/acre). The sodium absorption ratio is 13.60 (calculated) and the exchangeable sodium is 0.7 ppm both with no limits.

12. See attached general location map.
13. See attached topographical map.
14. See attached field/soil map.
15. See attached field/soil map and design data from original application.
16. See borings from original application.
17. Exchangeable Sodium: 0.7 ppm; Exchangeable Calcium: 72.2 ppm; Chromium: 6.0 mg/l; Manganese: 80 mg/l. The textural classification is sandy loam (56% sand; 31.2% silt; 12.8% clay). Soil sample data for additionally requested parameters are attached.
18. See final DCR-approved Nutrient Management Plan, attached.
19. See final DCR-approved Nutrient Management Plan, attached.

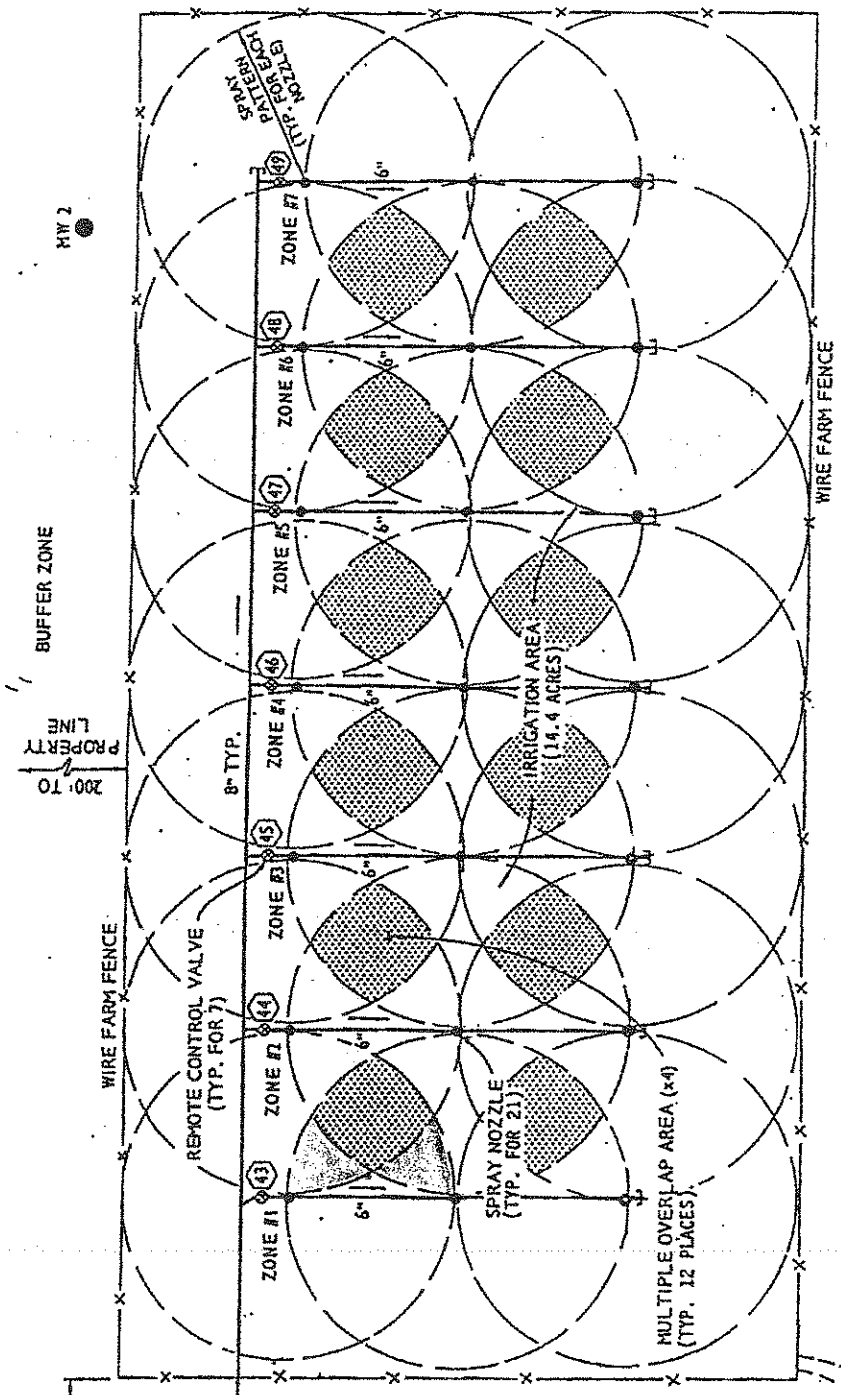
2w





2c

SW 3
AT EXISTING
FRESH WATER POND



HW 1 225'±
8' FROM
CHLORINATION
BUILDING

○ VALVE NUMBER

HW 3

GRAVEL ACCESS ROAD

RAPPANHOKE RESTRICTION/CANTERBURY	
Figure 6	
LAND APPLICATION FIE	
DESIGNER JOHN MCNAIR & CONSULTING INC WAYNESBORO, V	DATE JAN 1972
PROJECT NUMBER J14122	SCALE 1" = 100'
SHEET NO. 1 OF 1	

Page 8 of 33

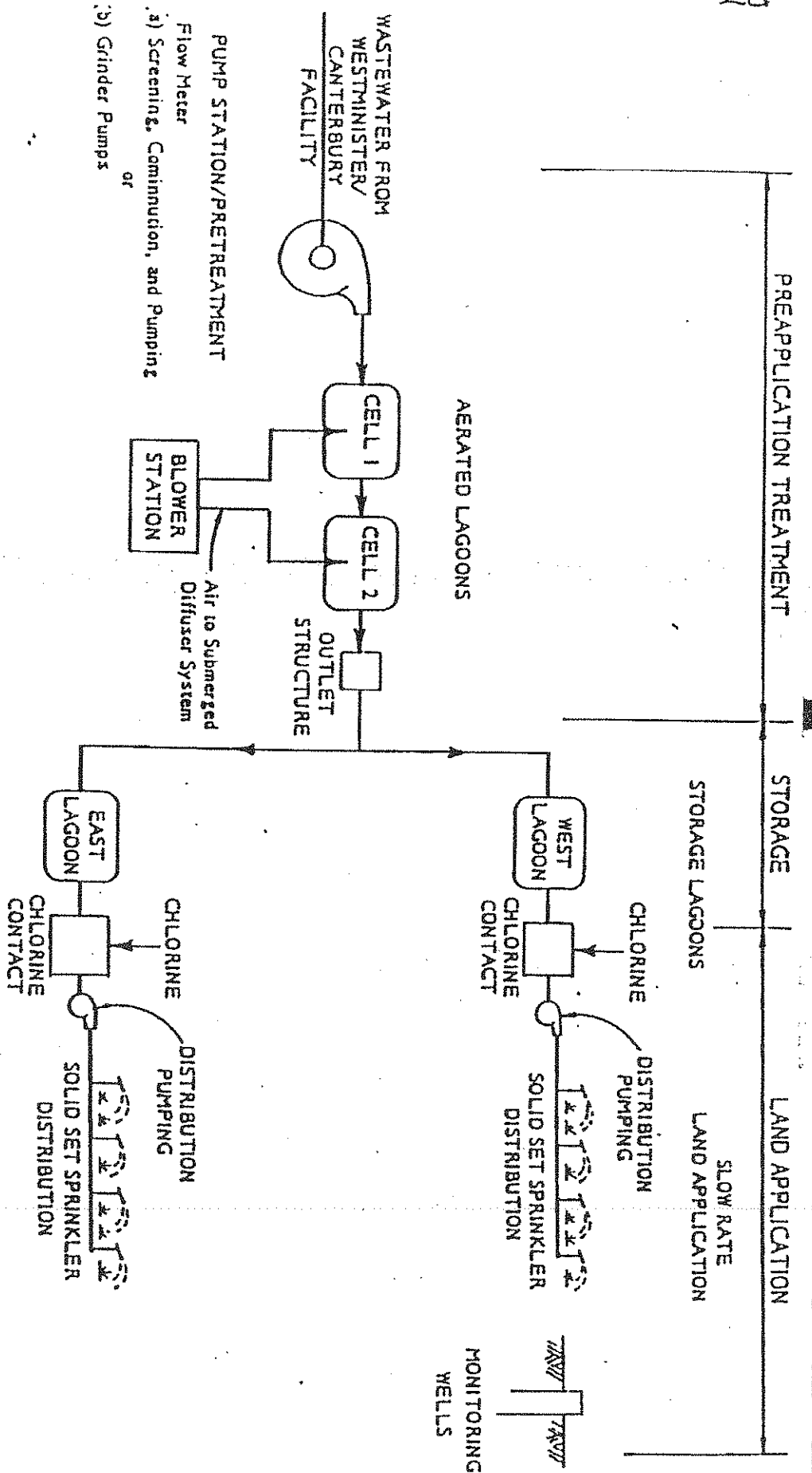


Figure 2
FLOW SCHEMATIC

RAPPAHANOCK WESTMINISTER/CANTERBURY	
REVISION	
DATE	
BY	
DESIGNED BY	BJ
CHECKED BY	BJ
APPROVED	BJ
DATE	10-27-82
SCALE	AS SHOWN
PROJECT NUMBER	1-1177
JOHN MCNAIR & ASSOCIATES	
CONSULTING ENGINEERS	
WAYNESBORO, VIRGINIA	
1-1177	
NOT SCALE	
TYPICAL	



STATE CORPORATION COMMISSION

Richmond, September 26, 1980.

*This is to Certify that the certificate of incorporation of
Rappahannock Westminster-Canterbury, Inc.
was this day issued and admitted to record in this office
and that the said corporation is authorized to transact its
business subject to all the laws of the State applicable to
the corporation and its business.*

State Corporation Commission

William C. [Signature]
Clark of the Commission

—

A): NWS Scinches class A Pan evaporation for coastal Virginia :
 Maximum LAF application load (per SCAT Regs. 9VAC25-760) :
 4.5 acres at 2 in/wk at 27,154 gal/acre/in = 40,945,732 MG

3333

உலகம்

hydraulic loading was not violated in 2008, 2009, 2010, and partial 2011.

Daily Design Flow	0.050 MG
Annual Design Flow	18,260 MG
Storage Capacity	10,127 MG
Average Daily Flow	0.027 MG
Design Flow Days in Storage	203 days
Monthly Average Design Days in Storage	56 days
Daily Average Daily Flow Days in Storage	103 days

1. Climatic Data and Partial Water Balance

Rappahannock Westminister-Canterbury, Lancaster County, Virginia

MONTH	PRECIPITATION ¹	EVAPOTRANSPIRATION ²	ALLOWABLE PERCOLATION ³	MAXIMUM WATER ADDITION ⁴
	inches	inches	inches	inches
Jan.	2.36	0.90	24	19.18
Feb.	3.30	1.00	24	18.40
Mar.	3.27	1.71	24	19.17
Apr.	2.88	2.74	24	20.98
May	3.74	3.70	24	20.22
June	3.92	4.56	24	20.72
July	6.05	4.96	24	16.95
Aug.	4.54	4.81	24	19.73
Sept.	3.70	4.27	24	20.87
Oct.	2/39	3.19	24	22.41
Nov.	2.71	2.10	24	20.68
Dec.	3.22	1.10	24	18.66
	42.08	35.04	288	237.97

¹Mean monthly precipitation, Norfolk, Virginia

²Computed using formula after Holdrige (Ecol 43:1-9, 1962) and Norfolk, Virginia temperature data.

³Computed using the following formula: Allowable precipitation = (percolation permeability rate) (8 hrs/day)(30 days/mo)(safety factor). A.P. = (1.0 in/hr) (8 hr/day)(30 days/mo)(0.1) = 24".

⁴Computed using the following formula: (allowable precipitation + ET - 2 (Mean Monthly Precipitation) i.e. Jan. = 24 + 0.90 - 2 (2.86) = 19.18

from 9/3/1993 VPA application

Rappahannock Westminster-Canterbury WWTF (VA0091511)

Effluent Loading Calculations

Gal to L

0.264172051

Gallons

2010

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Avg

Lbs

453592.37

mg

Nitrogen mg/l

6.82

Lbs

27,649,481

mg

Phosphorus mg/l

3.01

Lbs

12,203,070

mg

Potassium mg/l

16.20

Lbs

65,677,652

mg

Lead mg/l

BDL 0.05 mg/l

Lbs

not monitored

Unknown

104.59

mg

Copper mg/l

BDL 0.02 mg/l

Lbs

44.03

mg

Zinc mg/l

BDL 0.02 mg/l

Lbs

121,625

mg

Nickel mg/l

BDL 0.02 mg/l

Lbs

4,445

mg

Cadmium mg/l

BDL 0.01 mg/l

Lbs

210

mg

Selenium mg/l

BDL 0.01 mg/l

Lbs

44.03

mg

Manganese mg/l

BDL 0.01 mg/l

Lbs

44.03

mg

Iron mg/l

BDL 0.01 mg/l

Lbs

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Zinc mg/l

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Lbs

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mg

Nickel mg/l

BDL 0.02 mg/l

Lbs

4,445

mg

Cadmium mg/l

BDL 0.01 mg/l

Lbs

ANNAUL REPORT
PART B

2. Operating Data - Land Application Field

A. Total Gallons Applied for the Year	11,200,000.00
Total Days Applied	49.00
Average Flow (gallons/day)	228,571.00

B. Flow Applied (inches/month/zone) by month

Month	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7
January	2.49	1.76	2.49	1.76	2.49	1.76	2.49
February	2.34	2.13	2.34	2.13	2.34	2.13	2.34
March	3.54	3.05	3.54	3.05	3.54	3.05	3.54
April	2.76	2.90	2.76	2.90	2.76	2.90	2.76
May	1.26	1.38	1.26	1.38	1.26	1.38	1.26
June	1.79	1.68	1.79	1.68	1.79	1.68	1.79
July	1.77	2.16	1.77	2.16	1.77	2.16	1.77
August	0.24	0.22	0.24	0.22	0.24	0.22	0.24
September	0.00	0.00	0.00	0.00	0.00	0.00	0.00
October	1.30	1.26	1.30	1.26	1.30	1.26	1.30
November	1.78	1.92	1.78	1.92	1.78	1.92	1.78
December	0.52	0.45	0.52	0.45	0.52	0.45	0.52
Total (in/zone)	19.79	18.91	19.79	18.91	19.79	18.91	19.79

ANNUAL REPORT
PART B

6. Annual Cumulative Loading for Nitrogen and Phosphorous (Land Application Field)

<u>Month</u>	Effluent Applied (gals/month)	PAN Applied by Zone (pounds/acre)						
		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7
January	1,071,000	3.77	3.32	3.77	3.32	3.77	3.32	3.77
February	1,235,000	4.58	3.86	4.58	3.86	4.58	3.86	4.58
March	1,961,000	2.96	2.65	2.96	2.65	2.96	2.65	2.96
April	1,760,000	5.02	5.14	5.02	5.14	5.02	5.14	5.02
May	745,000	1.09	1.15	1.09	1.15	1.09	1.15	1.09
June	998,000	5.11	4.86	5.11	4.86	5.11	4.86	5.11
July	1,317,000	4.85	5.04	4.85	5.04	4.85	5.04	4.85
August	129,000	1.53	1.36	1.53	1.36	1.53	1.36	1.53
September	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
October	708,000	4.57	4.56	4.57	4.56	4.57	4.56	4.57
November	1,014,000	3.12	3.19	3.12	3.19	3.12	3.19	3.12
December	279,000	1.12	0.98	1.12	0.98	1.12	0.98	1.12
TOTAL		37.72	36.11	37.72	36.11	37.72	36.11	37.72

16/4

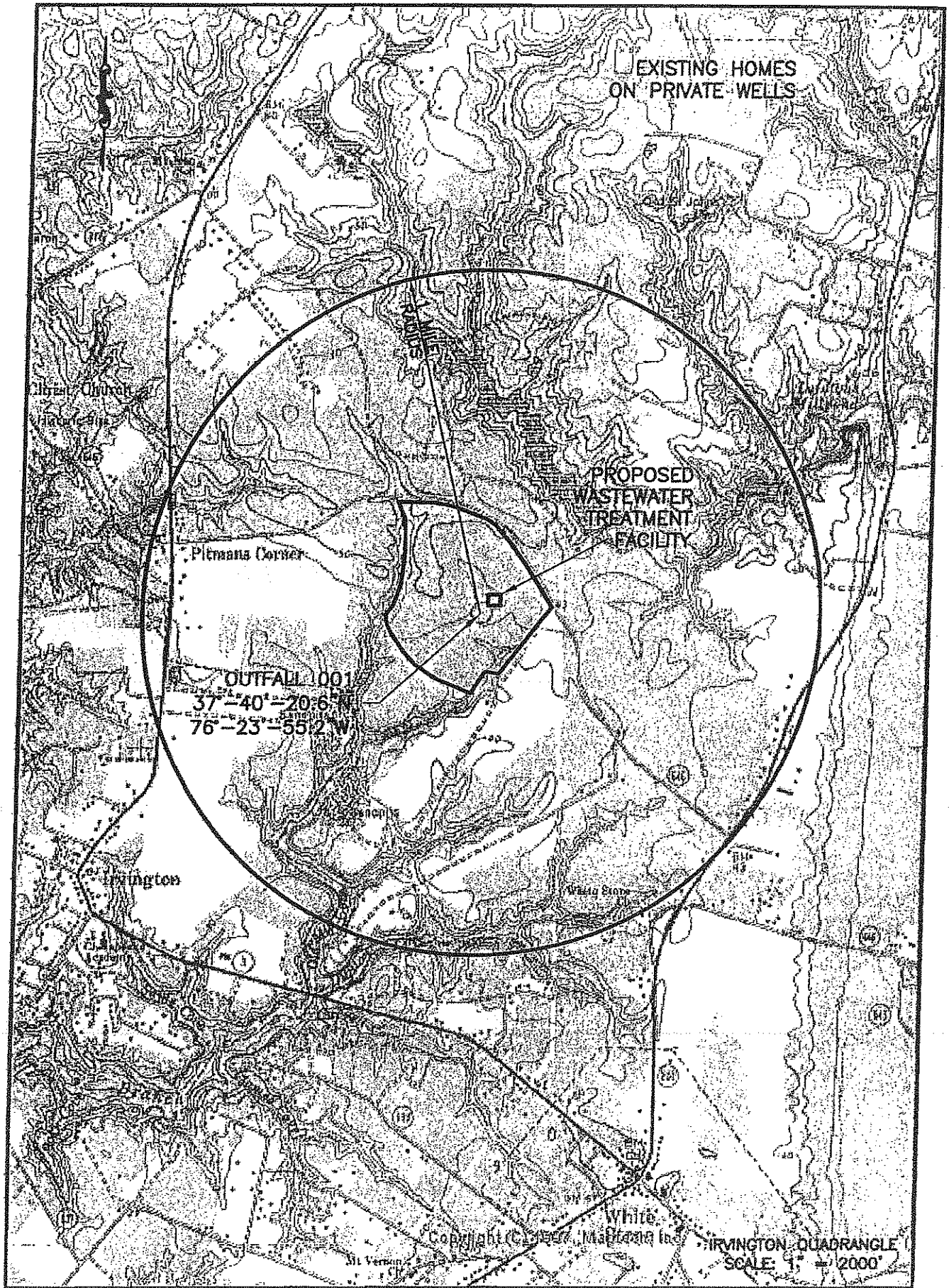
ANNUAL REPORT
PART B

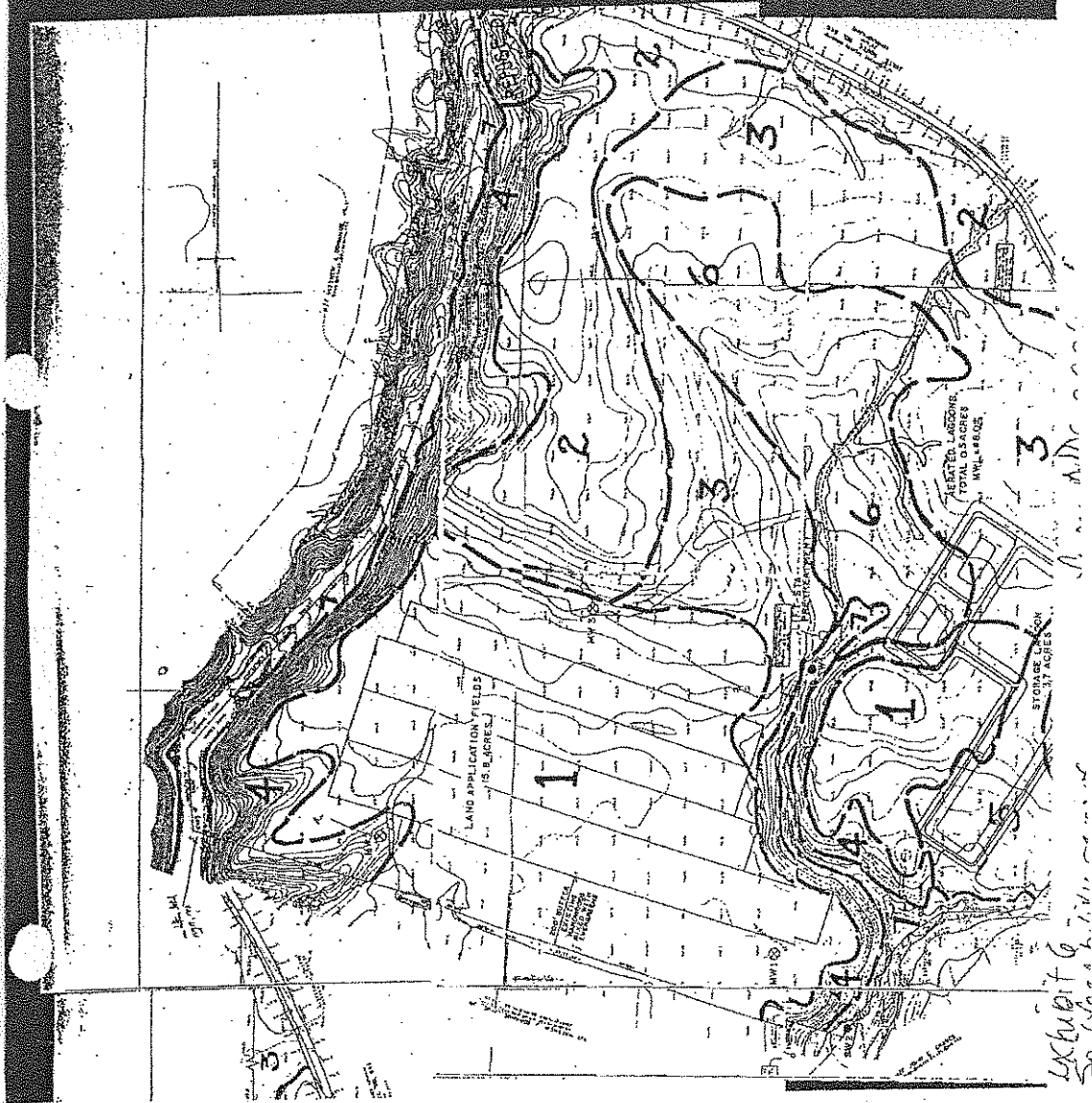
6. (CONTINUED) Remaining Site Life of the Land Application Field

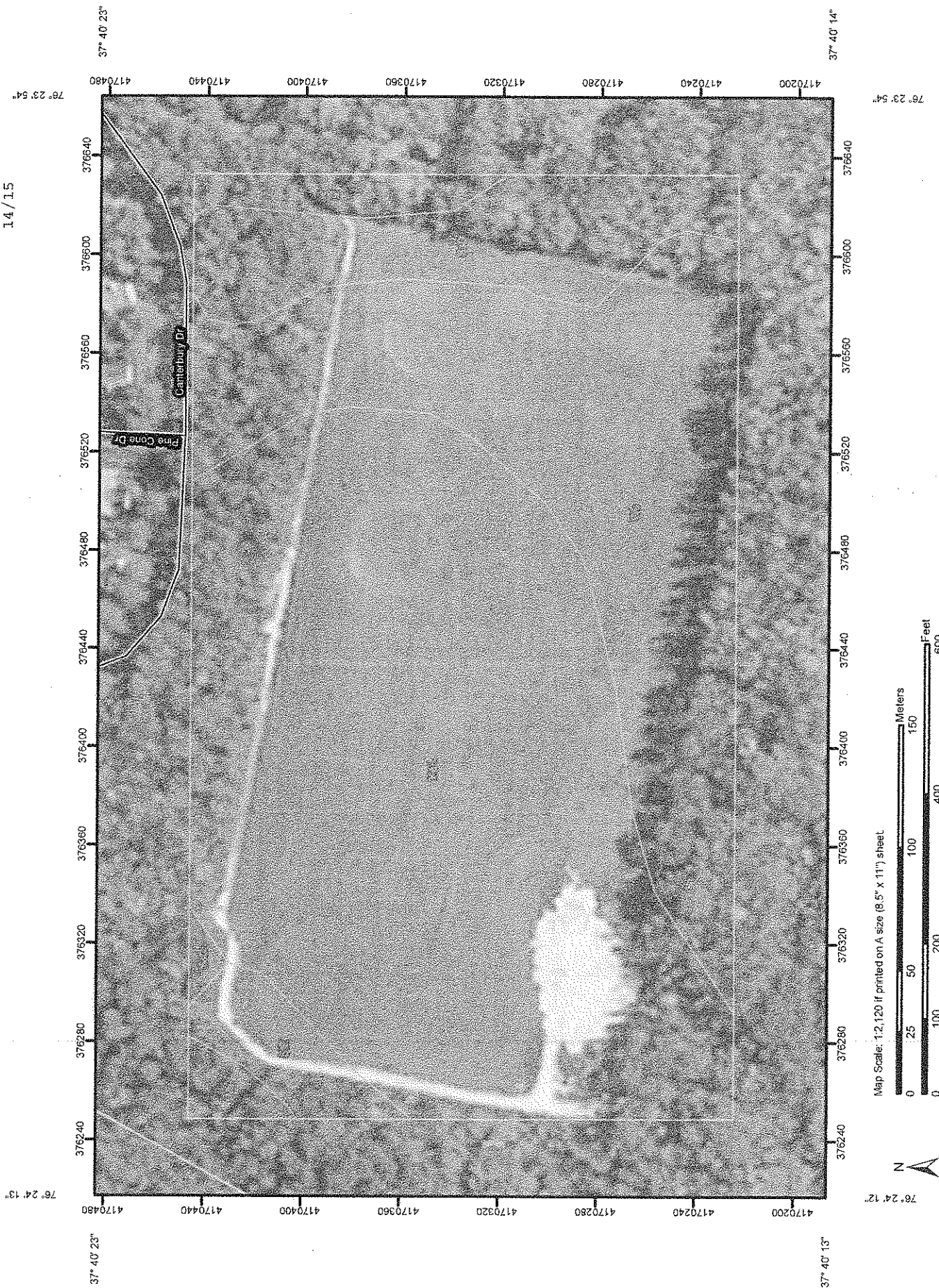
RWC is required to test for metals in the effluent 1/5 years. Samples were evaluated in 9/1999 and 9/2004. No data is available prior to 1999. Next sample due 4/2014.

Metal	1999	2004
Cadmium	BDL	BDL
Copper	0.0076 mg/l	BDL
Lead	0.006 mg/l	BDL
Nickel	0.05 mg/l	BDL
Zinc	0.04 mg/l	0.03 mg/l

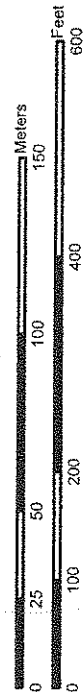
Metal	Average (mg/l)	Remaining Site Life (years)
Cadmium	BDL	Unknown
Copper	0.0076	1,686
Lead	0.003	852.3
Nickel	0.025	143.5
Zinc	0.035	24.4







Map Scale: 1:2,120 if printed on A size (8.5" x 11") sheet



MAP LEGEND

Area of Interest (AOI)		Very Stony Spot
Area of Interest (AOI)		Wet Spot
Soils		Other
Soil Map Units		
Special Point Features		
Blowout		
Borrow Pit		
Clay Spot		
Closed Depression		
Gravel Pit		
Gravelly Spot		
Landfill		
Lava Flow		
Marsh or swamp		
Mine or Quarry		
Miscellaneous Water		
Perennial Water		
Rock Outcrop		
Saline Spot		
Sandy Spot		
Severely Eroded Spot		
Sinkhole		
Slide or Slip		
Sodic Spot		
Spoil Area		
Stony Spot		
Special Line Features		
Gully		
Short Steep Slope		
Other		
Political Features		
Cities		
Water Features		
Streams and Canals		
Transportation		
Rails		
Interstate Highways		
US Routes		
Major Roads		
Local Roads		

MAP INFORMATION

Map Scale: 1:2,120 if printed on A size (8.5" x 11") sheet.
The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.
Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Northumberland and Lancaster Counties, Virginia

Survey Area Data: Version 8, Jan 11, 2010

Date(s) aerial images were photographed: 11/5/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Northumberland and Lancaster Counties, Virginia (VA133)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KeA	Kempsville fine sandy loam, nearly level	12.0	57.2%
Mx	Mixed alluvial land	0.2	1.0%
SsD	Sloping sandy land	2.1	9.8%
StE	Steep sandy land	0.6	3.0%
Wo	Woodstown fine sandy loam	6.1	28.9%
Totals for Area of Interest		21.0	100.0%

DESIGN DATA
RAPPAHANNOCK WESTMINSTER-CANTERBURY
LAND APPLICATION SYSTEM

Design average Flow= 50,000 gpd= 35gpm
Peak Flow (3.5 x avg.)=175,000 gpd=122.5 gpm
Wastewater domestic waste only

BOD₅: 240 mg/l=100 lbs./day
TSS: 240 mg/l=100 lbs./day

Treatment Processes

- 1) Pretreatment – Flow meter, with grinder pumps
- 2) Influent pumping – 2@ 122.5 gpm
- 3) Aerated Lagoons
 - Detention time=30 days
 - Volume: 30 x 50,000 gpd=1.5 mg=200,000 c.f.
 - Depth=10 ft.
 - Surface area in excess of 20,000 s.f.=0.46 acres
 - Maximum water elevation=48.0 ft.
 - Top of berm=51.0 ft.
 - Berm slopes (interior and exterior)=3 horizontal: 1 vertical
 - Number of cells=2
 - BOD Loading=0.5 lbs. BOD/1,000 c.f.
- 4) Aeration
 - Oxygen Required=2 lbs. O₂/lb. BOD=200 lbs./day
 - Use perforated pipe aeration tubing.

5) Holding Lagoons

Detention time=85 days

Volume=80 x 50,000 gpd=4.0 mg=533,333 c.f.

Depth of Storage Volume=3.5 ft. (lagoon depth=5 ft.)

Surface Area in excess of 152,380 s.f.=3.5 acres

Maximum water elevation=45.0 ft.

Top of berm=48.0 ft.

Berm slopes (interior and exterior)=3 horizontal: 1 vertical

Number of lagoons=2 (lagoon sizes proportional to spray field sizes)

6) Chlorination

Contact chamber shall provide 30 minutes contact time at maximum design pumping rate.

Chlorine residual in applied wastewater=1.5 mg/l. minimum.

7) Distribution Pumps -- Duplicate pumps shall be sized to deliver flow to the fields at flow and pressure suitable for field operation.

8) Land Application Field

Distribution system solid set rotary sprinklers

Spray diameter=271 feet

Maximum application rate=2 inches per week or ¼ inch per hour

Primary irrigation area=14.5 acres

Reserve irrigation area=0.0 acres

Total irrigation area=14.5 acres

Crops=Kentucky 31 Fescue an/or 44 hybrid Bermuda

ANNUAL REPORT
PART B

1. Operating Data - Wastewater Treatment Plant

Average Flow (gallons/day)	26,196
Total for Year (gallons)	9,561,540

BOD (mg/l)

Influent (Raw)	250 mg/l
Effluent (Cell 2)	57.33
Reduction (%)	77%

Total Suspended Solids {TSS} (mg/l)

Influent (Raw)	250 mg/l
Effluent (Cell 2)	64.4
Reduction (%)	74%

pH (S.U.)

Influent (Raw)	7.0
Effluent (Cell 2)	7.0

Chlorination

Total Residual Chlorine (mg/l)	2.11
--------------------------------	------

16...

SCHNABEL ENGINEERING ASSOCIATES

P. C.

CONSULTING GEOTECHNICAL ENGINEERS

June 8, 1983

JAMES I. SCHNABEL P. E.
RAY E. MARTIN PH. D., P. E.
RAYMOND A. DESTEPHEN P. E.

RECEIVED

ONE WEST CARY STREET
RICHMOND, VIRGINIA 23220
801-649-7035

Mr. Eugene A. Siudyla
Tidewater Regional Office
State Water Control Board
287 Pembroke Office Park
Suite 310, Pembroke II
Virginia Beach, Virginia 23462

JUN 10 1983

STATE WATER CONTROL BOARD
Tidewater Regional Office

Subject: Contract V83206, Geotechnical Engineering
Services, Rappahannock Westminister-Canterbury,
Lancaster County, Virginia

Dear Gene:

In response to our telephone conversation of last week, enclosed are pertinent test boring logs (B-29, B-32 through B-38, monitoring wells MW-1, MW-2 and MW-3) and a location plan for the above referenced project. The information included relates to the storage lagoons and land application terraces for this project. Soil stratifications are presented on the test boring logs. The soils of Strata A, B and C represent Columbia Group sediments, while Stratum D represents the Yorktown Formation.

Three monitoring wells were installed around the proposed land application terraces at the locations shown on the Test Boring Location Plan. They were constructed with 1-1/2 inch flush joint PVC pipe and 1-1/2 inch No. 20 slot well screens. The bottom of each well was covered with a PVC cap. Well screens were installed within five feet of the depth groundwater was encountered, at the depths indicated on the boring logs. The annular space was backfilled with clean concrete sand to the top of screen and then a 12 inch⁺ thick bentonite seal was installed. The remaining annular space was backfilled with cuttings from the boring. A four inch protective steel casing with locking cap was installed to a depth of three feet below ground surface and was grouted in place with lean concrete.

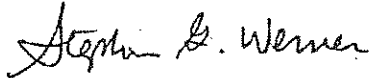
Water observation wells consisting of 1-1/4 inch PVC pipe were also installed in Borings B-33 and B-36. The bottom 10 ft. of each observation well was hand slotted and the annular space was backfilled with cuttings from the borings. These observation wells were installed for obtaining water level readings only and are not intended for use as sampling wells.

Mr. Eugene A. Siudyla
June 8, 1983
Page Two

If you should have any further questions concerning the enclosed information, please contact us. All questions as related to design of the land application facility should be directed to the Design Engineer, John McNair and Associates.

Very truly yours,

SCHNABEL ENGINEERING ASSOCIATES, P.C.



Stephen G. Werner, P.E.
Senior Engineering Geologist

SGW:maj

Enclosures:

- Subsurface Exploration Data
- General Notes for Test Boring Logs
- Identification of Soil Samples
- Test Boring Logs, B-29, B-32 through B-38,
MW-1 through MW-3
- Test Boring Location Plan, Sheet B-1

c: Mr. Bill Judy, John McNair & Associates
Mr. Charles Holcomb, Jr., Sherertz, Franklin, Crawford & Shaffner

SUBSURFACE EXPLORATION DATA

General Notes for Test Boring Logs

Identification of Soil Samples

Test Boring Logs, B-7, B-29, B-32 through B-43

Monitoring Well Logs, MW-1 through MW-3

Hand Auger Logs, HA-6 through HA-15

Test Boring Location Plan, Sheet B-1


Hollow Stem Auger Borings




All borings were drilled by hollow stem auger equipment. The Standard Penetration Test (SPT) was performed at the depths indicated on the Test Boring Logs. The augers were advanced to the desired depth with plug inserted or were advanced open end and then washed with a fish tail bit. The SPT was performed at the depth shown on the boring logs.

Boring Location and Elevation Survey

Test borings were located in the field by Dawson and Phillips, P.C. Certified Land Surveyors. Test boring elevations were also obtained by the same firm.

GENERAL NOTES FOR TEST BORING LOGS

1. NUMBERS IN "SAMPLE SPOON" COLUMN INDICATE BLOWS REQUIRED TO DRIVE A 2 INCH O.D., 1-3/8 INCH I.D. SAMPLING SPOON 6 INCHES USING A 140 POUND HAMMER FALLING 30 INCHES ACCORDING TO ASTM D-1586.
2. VISUAL CLASSIFICATION OF SOIL IS IN ACCORDANCE WITH TERMINOLOGY SET FORTH IN "IDENTIFICATION OF SOIL." THE UNIFIED SOIL CLASSIFICATION SYMBOLS SHOWN IN PARENTHESES ARE BASED ON VISUAL INSPECTION.
3. ESTIMATED GROUNDWATER LEVELS INDICATED BY ; THESE LEVELS ARE ONLY ESTIMATES FROM AVAILABLE DATA AND MAY VARY WITH PRECIPITATION, POROSITY OF THE SOIL, SITE TOPOGRAPHY, ETC.
4. REFUSAL AT THE SURFACE OF ROCK, BOULDER, OR OBSTRUCTION IS DEFINED AS A PENETRATION RESISTANCE OF 100 BLOWS FOR 2 INCHES PENETRATION OR LESS.
5. THE BORING LOGS AND RELATED INFORMATION DEPICT SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC LOCATIONS AND AT THE PARTICULAR TIME WHEN DRILLED. SOIL CONDITIONS AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THESE BORING LOCATIONS. ALSO, THE PASSAGE OF TIME MAY RESULT IN A CHANGE IN THE SUBSURFACE SOIL AND GROUNDWATER CONDITIONS AT THESE BORING LOCATIONS.
6. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL AND ROCK TYPES AS DETERMINED FROM THE DRILLING AND SAMPLING OPERATION. SOME VARIATION MAY ALSO BE EXPECTED VERTICALLY BETWEEN SAMPLES TAKEN. THE SOIL PROFILE, WATER LEVEL OBSERVATIONS AND PENETRATION RESISTANCES PRESENTED ON THESE BORING LOGS HAVE BEEN MADE WITH REASONABLE CARE AND ACCURACY AND MUST BE CONSIDERED ONLY AN APPROXIMATE REPRESENTATION OF SUBSURFACE CONDITIONS TO BE ENCOUNTERED AT THE PARTICULAR LOCATION.
7. BORING LOG VERTICAL SCALE: 1/10 INCH = 1 FT.
8. TEST BORINGS DRILLED BY AYERS AND AYERS, INC., RICHMOND, VIRGINIA UNDER INSPECTION OF SCHNABEL ENGINEERING ASSOCIATES.
9. KEY TO SYMBOLS AND ABBREVIATIONS:

S	STANDARD PENETRATION TEST	*, NO SAMPLE RECOVERY
2" 	2" or 3" UNDISTURBED TUBE SAMPLE (RECOVERY SHOWN IN REMARKS COLUMN)	do, DITTO
	PRESSUREMETER TEST	RQD, ROCK QUALITY DESIGNATION
V	VANE SHEAR TEST	w, NATURAL MOISTURE CONTENT
C	STATIC CONE PENETRATION TEST	
2" 	NX OR 2 INCH O.D. ROCK CORE RUN (RECOVERY SHOWN IN REMARKS COLUMN)	

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL COMPONENTS				II. DEFINITION OF COMPONENT PROPERTIES		
Major Material Component	Material Fraction	Sieve Size	Plasticity	Component	Proportions of Soil Components	Approximate Percentage by Weight
GRAVEL, GM, GC, GP, GW	Coarse Fine	3/4 to 3" No. 4 to 3/4	— —	Major	<u>Noun Form</u> Gravel, Sand, Silt, Clay, etc.	50 or more
SAND, SM, SC, SP, SW	Coarse Medium Fine	No. 10 to No. 4 No. 40 to No. 10 No. 200 to No. 40	— — —	Minor	<u>Adjective Form</u> Gravelly, Sandy, Silty, Clayey Silty, Clayey, Silty Clayey	35 to 50
SILT, ML	—	Passing No. 200	Non-plastic		<u>Some</u> Some Gravel, Some Silt, etc.	12 to 35
CLAYEY SILT, ML, MH, CL-ML	—	Passing No. 200	Slight to High			
SILTY CLAY, CL	—	Passing No. 200	Medium to High			
CLAY, CH	—	Passing No. 200	Very High			
ORGANIC SILT, OH, OL	—	Passing No. 200	Slight to High			
PEAT; Pt	Partially decomposed fibrous organic matter with or without silt or sand filter				<u>Trace</u> Trace Gravel, trace sand, etc.	1 to 12
					<u>With</u> with rock fragments, with organic matter, etc.	Indicates presence only

III. GLOSSARY OF MISCELLANEOUS TERMS	
<p>SYMBOLS — Unified Soil Classification Symbols are shown in major material component column. Use A Line Chart for laboratory identification.</p> <p>BOULDERS — Rounded pieces of rock larger than 3 inches</p> <p>DISINTEGRATED ROCK — Residual soil with a standard penetration resistance of at least 60 blows or more per foot</p> <p>ROCK FRAGMENTS — Angular pieces of rock, distinguished from transported gravel, which have separated from original vein or strata and are present in a soil matrix.</p> <p>QUARTZ — A hard silica mineral often found in residual soils</p> <p>IRONITE — Iron oxide deposited within a soil layer forming cemented deposits</p> <p>CEMENTED SAND — Usually localized rock-like deposits within a soil stratum composed of sand grains cemented by calcium carbonate or other minerals</p> <p>MICA — A soft silica mineral found in many rocks, and in residual or transported soils derived therefrom</p> <p>FISSURED CLAYS — Cohesive soils exhibiting a joint structure</p> <p>ORGANIC MATERIAL (Excluding Peat): <u>Top Soil</u> — Surface soils that support plant life and which contain considerable amounts of organic matter; <u>Decomposed Vegetation</u> — Partially decomposed organic matter which retains its original character; <u>Lignite</u> — Decomposed organic matter with low fixed carbon content frequently exhibiting distinct texture of wood</p> <p>FILL — Man made deposit containing soil, rock and often foreign matter</p> <p>PROBABLE FILL — Soils which contain no visually detectable foreign matter but which are suspect with respect to origin</p> <p>LENSES — 0 to 1/2 inch layer of minor soil component</p> <p>LAYERS — 1/2 to 12 inch layers of minor soil component</p> <p>POCKET — Discontinuous pocket of minor soil component</p> <p>COLOR SHADES — Light or dark to indicate substantial differences in color</p> <p>MOISTURE CONDITIONS — Wet, moist, or dry to indicate visual appearance of specimen</p>	

SCHNABEL ENGINEERING ASSOCIATES CONSULTING ENGINEERS				TEST BORING LOG				BORING NO.: 157-1	
PROJECT: RAPPAHANNOCK WESTMINSTER CANTERBURY, LANCASTER, CO.								SHEET NO. 1 OF 1	
CLIENT: SHERIDAN FRANKLIN, CRAWFORD AND SHAFER								JOB NO.: V83206	
BORING CONTRACTOR: AYERS AND AYERS, INC.								ELEVATION: 41.03	
WATER LEVEL DATA				DRILL: OME-45		CASING SIZE: 3 1/2"		DATE START: 4-25-83	
DATE: 4-23				TIME: 11:30		DEPTH: 13.5'		DATE FINISHED: 4-25-83	
ENCOUNTERED				TYPE		S.S.		DRILLER: J. T. STONE	
AFTER CASING PULLED				DIA.		2" O.D.		INSPECTOR: J. DADULAS	
HR. READING				SEE TABLE BELOW		WT. 140#			
				FALL		30"			

STRATUM	DEPTH FT.	SYMBOL	IDENTIFICATION	REMARKS
	41.03		2"± ROOT MATTER	
	1+1+1	S	FINE TO MEDIUM SILTY SAND WITH ROOT FRAGMENTS, MOIST - TAN (SM - SC)	
	4+4+4	S	do, TRACE CLAY WITH FINE GRAVEL	
	3+4+5	S	do, SOME SILT	
	2+3+3	S	do, TRACE SILT, BROWNISH ORANGE	
	2+3+3	S		
	2+4+4	S	do, NET	
	3+3+4	S		
	4+5+4	S	do, TRACE FINE GRAVEL	
	2+3+3	S		
	3+5+7	S	do, SOME SILTY CLAY	
	3+7+7	S	do, FINE TO COARSE, TRACE SILT WITH CLAY LENSES - TAN AND REDDISH BROWN	
	41.5		FINE SANDY CLAYEY SILT, MOIST - DARY GRAY (ML)	
	1+1+2	S		
	1+3+6	S		
	4+5+9	S		
	60.0	2+3+4	S	
BORING TERMINATED AT 60.0 FT				
WATER OBSERVATION WELL DATA				
Date	Day	Depth (ft)	Remarks	
4-25	0	12.0	Installed to 60 ft	
4-26	1	9.6		
4-28	3	9.4		

Installed well
screen between
15' and 20' depth

41
15
26

41
20
21

SCHNABEL ENGINEERING ASSOCIATES CONSULTING ENGINEERS		TEST BORING LOG		BORING NO.: MW-2	
PROJECT: RAPPAN/ROCK WESTMINSTER CANTEBURY, LANCASTER, CO.				SHEET NO. 1 OF 1	
CLIENT: SHERIDAN, FRANKLIN, CRAWFORD AND SHAFNER				JOB NO.: V83206	
BORING CONTRACTOR: AYERS AND AYERS, INC.				DRILL: OME-45	
WATER LEVEL DATA				ELEVATION: 36.5'	
DATE: 4-26				CASING SIZE: 2 1/2"	
TIME: 1:35				DATE START: 4-26-83	
DEPTH: 9.0'				DATE FINISHED: 4-26-83	
CAVED: -				DRILLER: J. T. STONE	
TYPE: DIA.				INSPECTOR: J. DAVULAS	
S.S. 2' O.D.					
WT. 140 #					
FALL 30"					
HR. READING				SEE TABLE BELOW	

STRATUM	DEPTH FT.	ELEV. FT.	ROWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
					2"± ROOT MATTER	
			3+2+1	S	FINE TO MEDIUM SAND, SOME SILT WITH ROOT FRAGMENTS - MOIST - ORANGISH BROWN (SM)	
			3+4+5	S	do, CLAYEY SILTY SAND WITH ORGANIC MATTER - BROWN	
			2+3+4	S	do, SILTY SAND - LIGHT BROWN	
			4+3+2	S	do, ORANGISH BROWN	
			3+3+3	S	do, SOME SILT - WET	
			1+2+3	S		
	20.0		3+2+6	S	do, TAN	Installed well screen at 10' to 15' depth
BORING TERMINATED AT 20.0 FT						
WATER OBSERVATION WELL DATA						
Date	Day	Depth (ft)	Remarks			
4-26	0	3.9	Installed to 20 ft			
4-28	2	4.2				

26.5
15
21.5

SCHNABEL ENGINEERING ASSOCIATES CONSULTING ENGINEERS				TEST BORING LOG				BORING NO.: M-3	
PROJECT: RAPPAHANNOCK REDEMPTION CENTER, LANCASTER, CO.								SHEET NO. 1 OF 1	
CLIENT: SHEPHERD, FRANKLIN, CRAWFORD AND SHAFER								JOB NO.: V83206	
BORING CONTRACTOR: AYERS AND AYERS, INC.								ELEVATION: 45.0'	
WATER LEVEL DATA								DRILL: CMF-45	
DATE: 4-26								CASING SIZE: 3 1/2"	
TIME: 9:25								DATE START: 4-26-83	
DEPTH: 13.5'								DATE FINISHED: 4-26-83	
CAVED: -								DRILLER: J. T. STONE	
ENCOUNTERED: 4-26								INSPECTOR: J. DAULAS	
AFTER CASING PULLED: 4-26									
HR. READING: SEE TABLE BELOW								FALL: 30"	
STRATUM	DEPTH FT.	ELEV. 45.0'	LOGS CORRECTION SAMPLER SPOOL PER 6'	SYMBOL	IDENTIFICATION			REMARKS	
					1" ROOT MATTER				
			7+5+3	S	FINE TO MEDIUM SILTY SAND WITH ROOT FRAG-				
			3+1+2	S	MENTS, MOIST - TAN (SM)				
					do, LIGHT BROWN				
		40	4+5+4	S	do, WITH FINE GRAVEL				
			3+5+4	S					
			3+5+5	S	do, SOME SILT				
		30	4+7+6	S	do, WET			Installed well screen at 15' to 20' depth	
			3+3+3	S					
	25.0	20	4+5+5	S	do, MOIST - TAN				
BORING TERMINATED AT 25.0 FT									
WATER OBSERVATION WELL DATA									
	Date	Day	Depth (ft)	Remarks					
	4-26	0	13.5	Installed to 25 ft					
	4-26	0.5	3.8	-					
	4-28	2.0	4.0	-					

35 - 30

MORANDUM

2111 North Hamilton Street

State Water Control Board

P. O. Box 11143

File Copy # 10,9425

Richmond, VA 23230

NEW USB-File
Rappahannock
Westminister Canterbury

SUBJECT: Approval of Final Plans & Specifications for
Sanitary Collection and Land Application Facilities

TO: Executive Director

FROM: Assistant Director of Operations, OWRM

DATE: October 29, 1984

COPIES: TRO

Ray G. Jensen
NOV 13 1984

STATE WATER CONTROL BOARD
TIDEWATER REGION

Project Name: Rappahannock Westminister Canterbury
Project Location: Lancaster County, Virginia
Project Owner: Rappahannock Westminister Canterbury, Inc.
Project Scope: Gravity sewers, pump station, force main, and land application sewage treatment facility. (See attached SDH letter).

H Approval Date: September 10, 1984.

SDH Conditions:

1. That an O & M Manual for the pump station and treatment plant will be completed and approved by the Department and the Board before a CTO is issued and these sewerage facilities are put into service.
2. That an adequately sized, on-site generator with automatic transfer switch must be provided to run the pump station and one of the treatment plant blowers during power failures.

Date of Certification
By Treatment Works Owner: N/A

Receiving Facility/
Current Plant Performance: N/A

Previous Board/Executive
Director Action: No-Discharge Certificate No. MW-ND-020 issued to facility on August 19, 1983.

Staff Comments: Since the date of the Health Department approval the staff has (1) learned that the storage lagoon and liners have been constructed, and (2) reviewed data which has raised concerns regarding the effect of the seasonal water table on liner integrity. These concerns have been discussed with the project engineers who have agreed to install 3 additional monitoring wells and to maintain a liquid level of 1.5 ft. in the storage lagoons until more data is gathered on the water table in this area. The staff believes that these measures are necessary to insure the integrity of the lagoon liners.

Approval of Final Plans and Specifications for
itary Collection and Land Application Facilities
Page 2

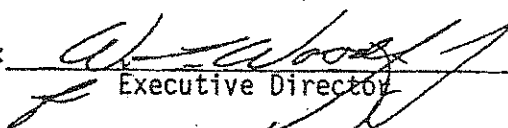
STAFF RECOMMENDATIONS:

In accordance with the approval of the State Department of Health contained in their letter of September 10, 1984, the staff recommends that the Executive Director conditionally approve these plans and specifications subject to the following conditions:

1. Three additional monitoring wells will be immediately installed around the storage lagoons. The wells shall be located on the berm or near its toe at approximately mid-width of the lagoon. One well shall be located between the two lagoons and one at each end of both lagoons. The wells shall be constructed in accordance with the approved well schematics and will measure the seasonal water table elevation beneath the lagoon.
2. Both storage lagoons shall be filled with water to the 1.5 ft. level as soon as possible after completion of liner testing. This liquid level shall be maintained.

HWW:dak

APPROVED BY:


Executive Director


Date

7. The design flow is 50,000 gpd. The average flow for 2010 was 26,197 gpd.

8. Form D III – Effluent Characterization Form is enclosed.

9. Nutrient Value of Effluent:

A. Nitrogen:	Ammonia	= 2.87 mg/l
	TKN	= 6.50 mg/l
	Nitrate	= 0.32 mg/l

Total Nitrogen: = 6.82 mg/l

= 44.03 pound/acre/year

Note: Original design loading was 20 mg/l.

B. Phosphorous: = 3.01 mg/l

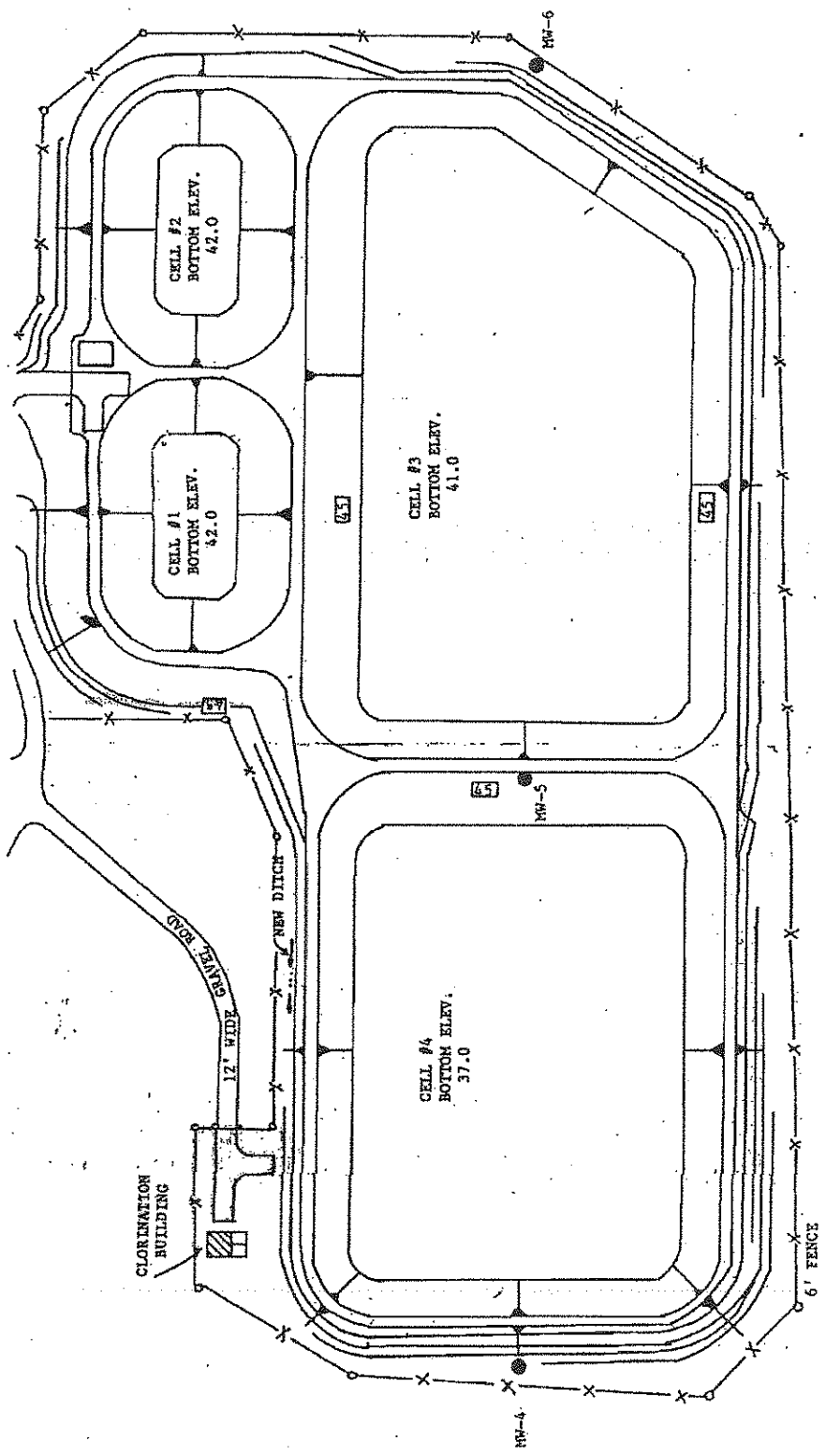
= 19.43 pound/acre/year


C. Potassium: = 16.20 mg/l

= 104.59 pounds/acre/year

10. An annual water balance analysis for January 2008 – June 2011 indicates that the Rappahannock Westminister-Canterbury WWTF is within the guidelines of the maximum hydraulic load of the land application field 40.948 MG or 104 inches/acre per SCAT regs (9VAC25-790). The maximum hydraulic load for the 14.5 acres is 238 inches/acre (per table). Thus the limiting factor is lower SCAT reg. 40.948 MG or 104 inches. During the analysis time period, the maximum annual (2009) hydraulic load was 38.713 MG including influent, precipitation collected in lagoons, precipitation on the land application field, net of evaporation at the rate of 50 inches/year (per the National Weather service for coastal Virginia). Volume in storage was sufficient for storage capacity ranging from 1.131 MG to 6.074 MG with a monthly average storage of 2.800 MG. The maximum storage capacity is 10.127 MG.

11. Total Nitrogen, TKN, soluble salt, manganese, and fluoride monitoring were discontinued in the permit issued March 28, 2007. Analysis of applied nitrogen, phosphorous, potassium, as well as metals (cadmium, copper, lead, nickel, and zinc) indicates none of the elements are limiting factors in the application of treated effluent on the Rappahannock Westminister-Canterbury WWTF land application field. Nitrogen is calculated to be 44.03 lb/acre which is below the 210 lb/acre limit and less than the calculation for the 2007 permit. Phosphorus is calculated to be 19.43 lb/acre with no limit and is below the 15.5 lb/acre



 FROELICH & ROBERTSON, INC. <small>INCORPORATED IN THE STATE OF CALIFORNIA 1981 10000 N. CENTRAL AVENUE, SUITE 200 DENVER, COLORADO 80231</small>		DRAWN BY RJC REVISION	
SCALE: NO SCALE	FAR PROJECT: M-55-057		DRAWING NUMBER 2
DATE: 4/1/85	MONITORING WELL INSTALLATION, WESTMINSTER - CANTERBURY W. M. JORDAN		
APPROXIMATE BORING LOCATION PLAN			DRAWING NUMBER 2

LOG



FROEHLING & ROBERTSON, INC.
 FULL SERVICE LABORATORIES • ENGINEERING/CHEMICAL
 "ONE HUNDRED YEARS OF SERVICE"

No. M-55-057

DATE April 1, 1985

by W. M. Jordan

Project: Monitoring Well Installation, Westminster - Canterbury

Boring No.: MW-4 Total Depth: 20.5' Elevation: Location: See Drawing No. 2

Type of Boring: Hollow Stem Auger Started: 3/21/85 Completed: 3/21/85 Driller: England

Depth	DESCRIPTION OF MATERIALS (Classification)	Sample Blows	Sample Depth (Feet)	Well Pipe	Back Pipe Fill	REMARKS
0.0						
3.0	Dark Brown Silty Fine to Medium SAND - Damp (SM) (Sedimentary)	14	2.0	Solid	Concrete	GROUNDWATER DATA Water Stood @ 11.6' Upon Completion with 19.0' of Auger Water Stood @ 10.0' Upon Removal of Auger 5' of 2" Diameter, 0.010 Slotted PVC Well Screen was Set @ 14.6' with 5' of Pipe Below *Bentonite
6.0	Stiff Brown Fine to Medium Sandy CLAY, with Root Fragments - Damp to Moist (CL) (Sedimentary)	6	3.5			
	Very Loose to Medium-Dense Brown, Orange Brown, and Gray Fine to Medium SAND, Little Silt - Wet (SP-SM) (Sedimentary)	6	9.0			
		6	10.5			
		1	14.0	Screen	9.6	
		2	15.5			
19.3		4	19.0	Solid	SAND	
20.5	NOTE (1)	5	20.5			
	Boring Terminated @ 20.5'					NOTE (1) Medium-Dense Grey Gray Fine to Coarse SAND, Little Silt - Wet (SP-SM) (Sedimentary)

No. of blows req'd. for a 140 lb. hammer dropping 30 in. to drive 2 in O.D., 1.375 in. I.D. sampler a total of 18 inches in three 6 increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

Scale 1"=5' unless otherwise noted

BORING LOG



FROEHLING & ROBERTSON, INC.
 FULL SERVICE LABORATORIES • ENGINEERING/CHEMICAL
 "ONE HUNDRED YEARS OF SERVICE"

Port No. M-55-057

DATE April 1, 1985

ent: W. M. Jordan

ject: Monitoring Well Installation, Westminster - Canterbury

ing No.: MW-5 Total Depth: 20.5' Elevation: Location: See Drawing No. 2

pe of Boring: Hollow Stem Auger Started: 3/21/85 Completed: 3/21/85 Driller: England

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	Sample Blows	Sample Depth (Feet)	Well Pipe	Back Fill	REMARKS
	0.0						
	2.2	Brown Fine to Medium Sandy CLAY, with Mica - Moist (CL) (Sedimentary)	9 12 9	2.0 3.5	Solid Screen	Concrete	GROUNDWATER DATA Water Stood @ 14.0' Upon Completion with 19.0' of Auger Water Stood @ 12.0' Upon Removal of Auger 5' of 2" Diameter 0.010 Slotted PVC Well Screen was Set @ 14.0' with 5' of Pipe Below *Bentonite
	8.0	Medium-Dense Brown Fine to Coarse SAND, Some Silt, with Pockets of Clay - Damp (SM) (Sedimentary)					
	15.0	Medium-Dense Brown Fine to Medium SAND, Little Silt - Damp (SM) (Sedimentary)	16 12 6	9.0 10.5			
	19.2	Loose Brown and Gray Fine to Coarse SAND, Little Clay, with Gravel - Moist to Wet (SC) (Sedimentary)	2 2 3	14.0 15.5			
	20.5	NOTE (1)	1 1 1	19.0 20.5	Solid	SAND	
		Boring Terminated @ 20.5'					NOTE (1) Very Soft Dark Gray Organic Fine to Medium Sandy CLAY, with Lenses of Orga Clayey Fine to Medi Sand - Wet (OL)

LOG



FROEHLING & ROBERTSON, INC.
 FULL SERVICE LABORATORIES • ENGINEERING/CHEMICAL
 "ONE HUNDRED YEARS OF SERVICE"

M-55-057

DATE April 1, 1985

by: W. M. Jordan

Project: Monitoring Well Installation, Westminster - Canterbury

Log No.: MW-6

Total Depth: 20.5'

Elevation:

Location: See Drawing No. 2

Type of Boring: Hollow Stem Auger

Started: 3/21/85

Completed: 3/21/85

Driller: England

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	Sample Blows	Sample Depth (Feet)	Well Pipe	Back Fill	REMARKS
	0.0						
	2.4	Brown Silty Fine to Medium SAND - Damp (SM) (Sedimentary)	3	2.0			
			6				
		Medium-Dense Brown and Gray Clayey Fine to Coarse SAND - Damp to Moist (SC) (Sedimentary)	9	3.5			
					Screen	Concrete	
			8	9.0		8.5	
			11			9.0	
			11	10.5			
	12.0				Screen		
		Loose to Medium-Dense Orange Brown Fine to Medium SAND, Some Silt, with Mica - Wet (SM) (Sedimentary)	3	14.0			
			4				
			5	15.5			
					Solid	SAND	
			8	19.0			
	20.5		8	20.5			
		Boring Terminated @ 20.5'					

GROUNDWATER DATA

Water Stood @ 10.3'
 Upon Completion with
 19.0' of Auger
 Water Stood @ 8.2'
 Upon Auger Removal

5' of 2" Diameter,
 0.010 Slotted PVC
 Well Screen was Set
 @ 14.6' with 5' of
 Pipe Below

*Bentonite

No. of blows req'd for a 140 lb hammer dropping 30 in to drive 2 in O.D. 1.375 in. I.D. sampler a total of 18 inches in three 6 in. increments of penetration is termed the standard penetration resistance, N.

Scale 1"=5' unless otherwise

10/11
17

ANNUAL REPORT
PART B

6. (CONTINUED) Remaining Site Life of the Land Application Field

RWC is required to test for metals in the effluent 1/5 years. Samples were evaluated in 9/1999 and 9/2004. No data is available prior to 1999. Next sample due 4/2014.

Metal	1999	2004
Cadmium	BDL	BDL
Copper	0.0076 mg/l	BDL
Lead	0.006 mg/l	BDL
Nickel	0.05 mg/l	BDL
Zinc	0.04 mg/l	0.03 mg/l

Metal	Average (mg/l)	Remaining Site Life (years)
Cadmium	BDL	Unknown
Copper	0.0076	1,686
Lead	0.003	852.3
Nickel	0.025	143.5
Zinc	0.035	24.4

ANNUAL REPORT
PART B5. Analysis of Land Application Field Soil (Average for the year)

<u>Parameter</u>	<u>Unit</u>	<u>Average</u>
Available Phosphorous	ppm	14.00
CEC	meq/100g	5.50
Soil Organic Matter	%	1.40
pH	S.U.	6.30
Organic Nitrogen	mg/kg	728.00
Ammonia-Nitrogen	mg/kg	1.90
Nitrate-Nitrogen	mg/kg	1.30
Hydraulic Conductivity	in/hr	31.79

Rappahannock Westminster-Canterbury WWTF; VPA0091511					
Soil Monitoring Analysis: Trend Summary (2008-2010)					
Parameter	Units	2008	2010	Trend	% Chg
Available Phosphorus	ppm	9	14	Up	56%
CEC	meq/100g	9.2	5.5	Down	-40%
Soil Organic Matter	%	2.7	1.4	Down	-48%
pH	s.u.	5.7	6.3	Up	11%
Organic Nitrogen	mg/kg	480	728	Up	52%
Ammonia Nitrogen	mg/kg	5	1.9	Down	-62%
Nitrate Nitrogen	mg/kg	5	1.3	Down	-74%
Hydraulic Conductivity	in/hr	NA	31.79	Unch	na

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street
Richmond, Virginia 23219-2010
(804) 786-1712

9/20/2011

Scott Rae
2357 Burch's Mill Road
Urbanna, VA 23175

Re: Nutrient Management Plan Submission: 9/19/2011

Dear Mr. Rae

Your nutrient management plan for Rappahannock Westminster-Canterbury, Inc. biosolids applications on Stuart Bunting's Farm located in Lancaster County in watershed(s) RA73 has been approved by the Department of Conservation and Recreation. Please note that this letter should be kept with the nutrient management plan.

This plan is for Field 0/IrrigatedFalls2010 on Tract RWC, Inc. This approval is conditional upon site field conditions on the 14.5 acre hay field being as stated in the nutrient management plan. It should be noted that this plan expires on 12/31/2012. We recommend revising this nutrient management plan at least six months prior to the expiration date. Feel free to contact me should you have any questions concerning this letter.

Sincerely,

A handwritten signature in black ink, appearing to read "MR Barnes McAden".

Rachel Barnes McAden
Environmental Specialist - Biosolids
Division of Stormwater Management
(804) 371-2762
rachel.mcaden@dcr.virginia.gov

cc:
DEQ Piedmont Regional Office

NUTRIENT MANAGEMENT PLAN IDENTIFICATION
For
RAPPAHANNOCK WESTMINSTER-CANTERBURY

Operator
Stuart Bunting
132 Lancaster Drive
Irvington, VA 22480
(804) 438-4021

Integrator:None

Farm Coordinates (UTMs)

Easting: 180376413, Northing: 4172579, zone: 17
http://us.blackberry.com/mapgen/index.jsp?lat=37.67289&scr_z=0&lon=-76.40074&label=Canterbury+Dr%252C+Irvington%252C+VA%252C+USA%252C+22480&address=Canterbury+Dr&city=Irvington®ion=VA&country=USA&postalCode=22480&z=0

Watershed Summary

Watershed: RA73
County: Lancaster

Nutrient Management Planner

Scott Rae
2357 Burch's Mill Road
Urbanna, VA 23175
andrewscottrae@gmail.com
(804) 824-1466

Certification Code: 296

Acreage Use Summary

Total Acreage in this plan: 14.5
Hayland: 14.5

Biosolid Summary

Lagoon Effluent

	Imported	Produced	Exported	Used	Net
kgals	0.	10,438*	0.	19,575.	-9,137

Plan written 9/18/2011
Valid until 12/31/2012

Signature: _____

A - Scott Rae

Planner

Sept. 19, 2011

date

*- produced and NPE

NUTRIENT MANAGEMENT PLAN IDENTIFICATION
For
RAPPAHANNOCK WESTMINSTER-CANTERBURY

Operator

Stuart Bunting
132 Lancaster Drive
Irvington, VA 22480
(804) 438-4021

Integrator:None

Farm Coordinates (UTMs)

Easting: 180376413, Northing: 4172579, zone: 17

http://us.blackberry.com/mapgen/index.jsp?lat=37.67289&scr_z=0&lon=-76.40074&label=Canterbury+Dr%252C+Irvington%252C+VA%252C+USA%252C+22480&address=Canterbury+Dr&city=Irvington®ion=VA&country=USA&postalCode=22480&z=0

Watershed Summary

Watershed: RA73
County: Lancaster

Nutrient Management Planner

Scott Rae
2357 Burch's Mill Road
Urbanna, VA 23175
andrewscott Rae@gmail.com
(804) 824-1466

Certification Code: 296

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Total Acreage in this plan: 14.5
Hayland: 14.5

Biosolid Summary

Lagoon Effluent

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Plan written 9/18/2011

Valid until 12/31/2012

Signature: _____

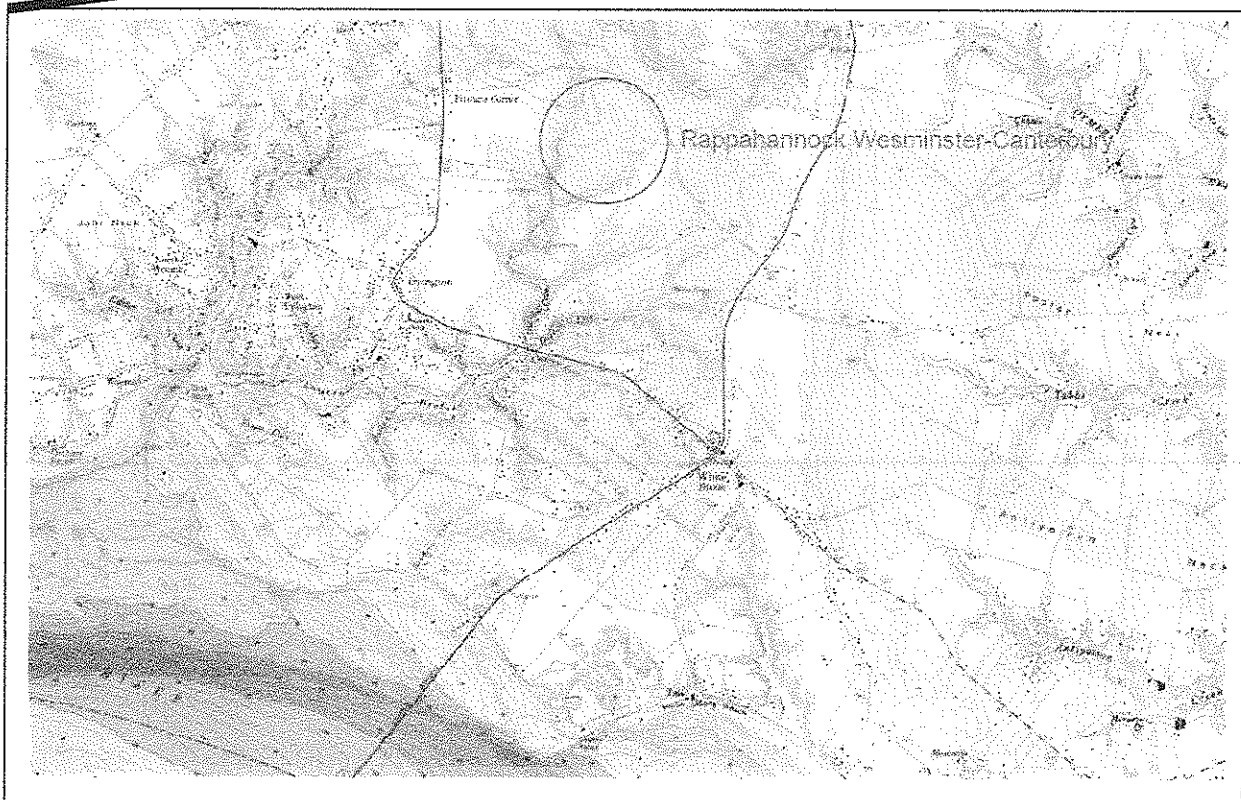
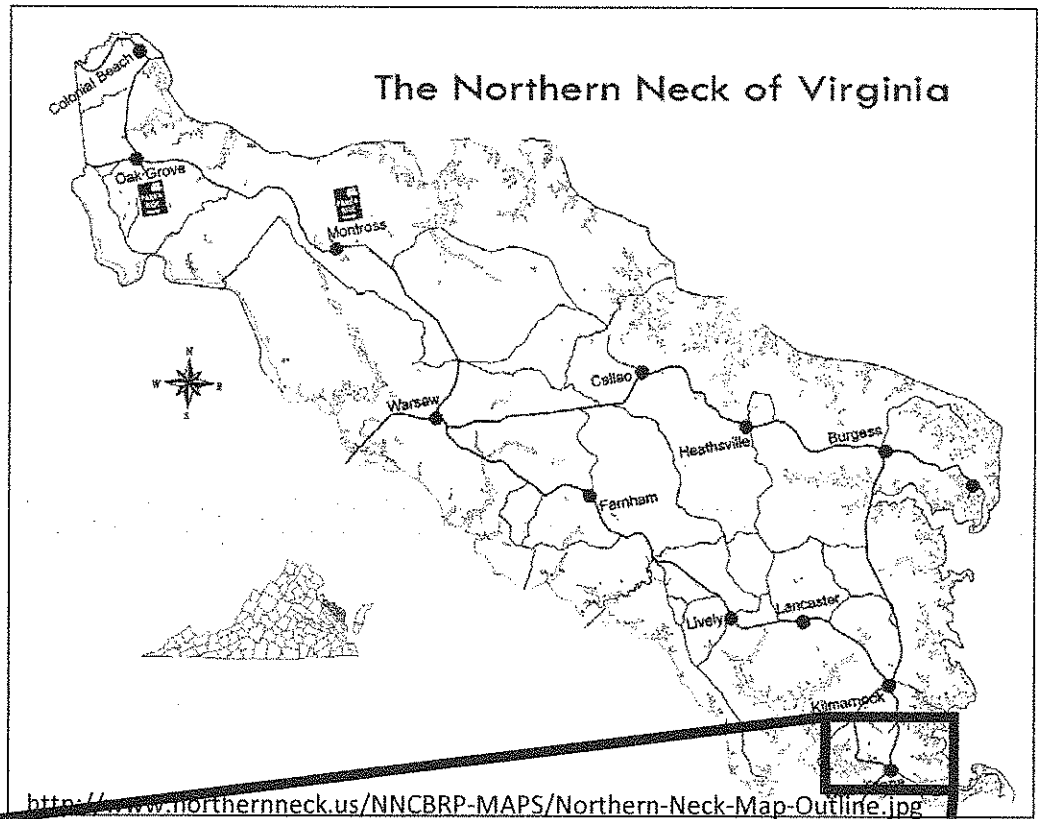
Planner

date

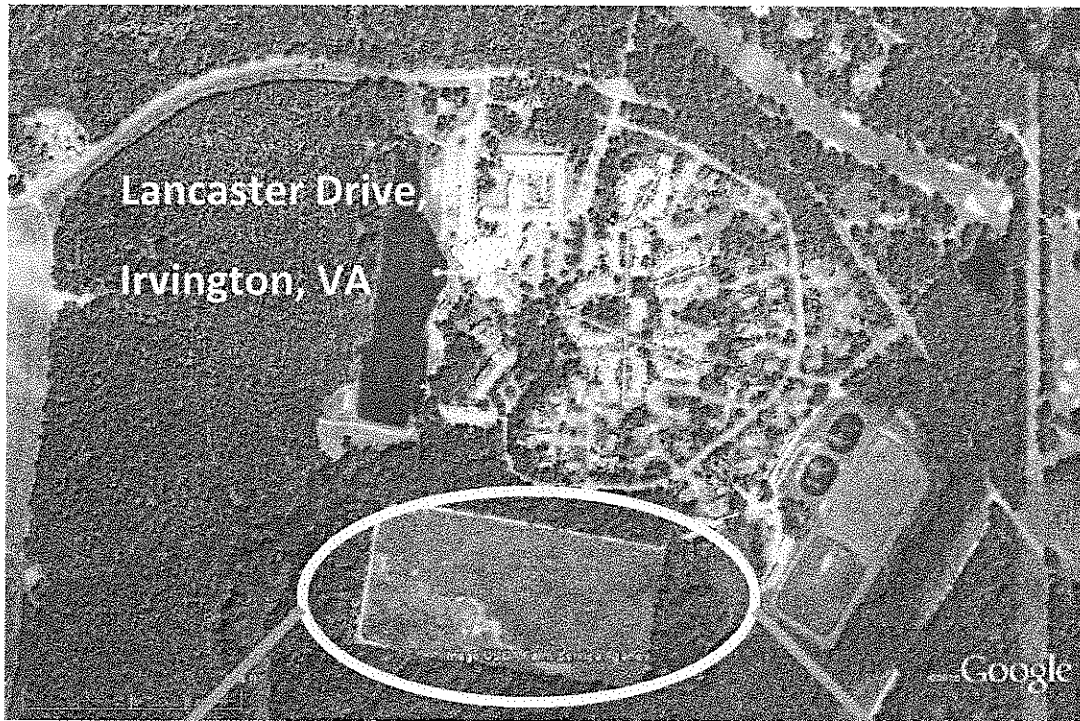
*- produced and NPE

VICINITY MAP

Rappahannock Westminister-Canterbury
132 Lancaster Drive, Irvington, Virginia 22480



AERIAL IMAGE- Rappahannock Westminster-Canterbury
132 Lancaster Drive, Irvington, Virginia 22480



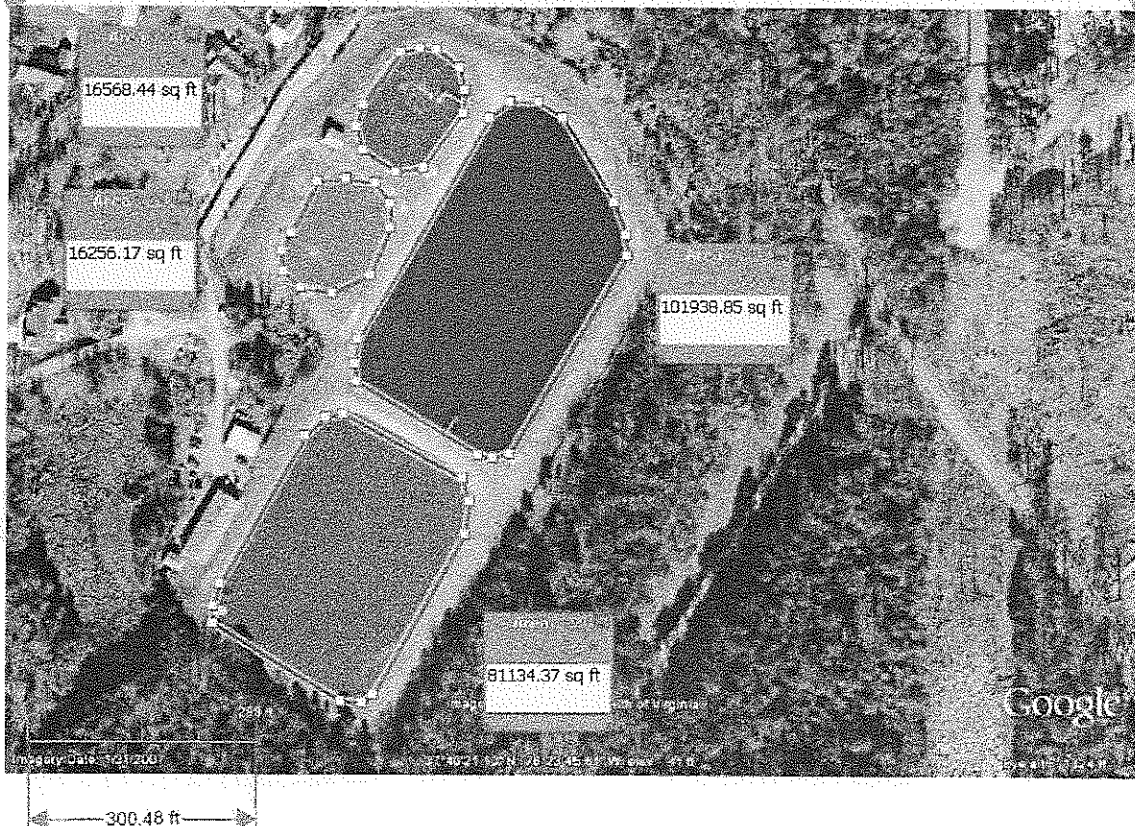
SOIL MAP OF HAYLAND (14.5 acres)
FOR IRRIGATION APPLICATION OF LAGOON EFFLUENT



AERIAL IMAGE- Rappahannock Westminster-Canterbury
132 Lancaster Drive, Irvington, Virginia 22480



LAGOON LOCATION
WITH DIMENSIONS OF CELLS (IN SQUARE FEET)



PICTURES FROM APPLICATION FIELD, AUGUST 2011



Farm Summary Report

Plan: New Plan Fall, 2011 - Winter, 2012

Farm Name: Rappahannock Westminster-Canterbury

Location: Lancaster

Specialist: Scott Rae

N-based Acres: 14.5

P-based Acres: 0.0

Tract Name: RWC, Inc

FSA Number: 0

Location: Lancaster

Field Name: IrrigatedFall2010

Total Acres: 14.50 Usable Acres: 14.50

FSA Number: 0

Tract: RWC, Inc

Location: Lancaster

Slope Class: A

Hydrologic Group: C

Riparian buffer width: 0 ft

Distance to stream: 0 ft

Conservation Practices:

Pasture (>75% cover)

P-Index Summary

N-based

Phosphorus Limit method: Phosphorus Environmental Threshold (PET) method

Soil Test Results:

DATE	PH	P	K	Lab
Su-2011	6.3	M(27 P lbs/acre)	M(111 K lbs/acre)	Virginia Tech

Field Warnings:

Rappahannock Westminster-Canterbury Narrative

This Nutrient Management Plan is prepared for Rappahannock Westminster-Canterbury, Inc. (RWC) as a component of their Virginia Pollution Abatement Permit renewal (VPA Permit #01401). RWC is a Life Care / Retirement Facility with a Waste Water Treatment Plant. The 2010 Annual Report for the Facility details land application of 11,200 kgals over a period of 49 days throughout the year. Total wastewater treated for 2010 is reported to be 9,561,540 gallons, total net precipitation excess from rainfall into lagoons is calculated at 786,560 gal/ yr.

Apply wastewater during periods of active plant growth. Do not apply wastewater between November 01 through March 01.

Do not apply to point of runoff. Do not apply when natural precipitation and irrigation may saturate soil resulting in limited plant uptake / growth [exceedance of field capacity]. Do not apply to frozen or snow-covered ground. Under no circumstances shall the hydraulic loading rates from liquid waste exceed 0.6 inches per hour (Soils are fine, sandy loam; no slope- 2005, Nutrient Management Standards and Criteria; Table 8.8, p. 116.) Allow sufficient drying time between subsequent irrigation and rainfall so that field capacity is not exceeded. Refer to Special Conditions section for additional limitations.

Soil tests qualify Phosphorus levels as M (medium); the NMP has not incorporated the Phosphorus Index. The plan has been prepared to preemptively prevent phosphorus accumulation in soils. The current vigorous growth of the hay crop represents adequate nutrient supplies. No supplemental commercial nitrogen applications are shown on the job / balance sheet. Long-term management / removal of soil phosphorus may benefit from commercial nitrogen applications potentially increasing plant yield effectively removing any excess P through plant materials. A Spring (~March 01-15) and Summer application (~August 01-15) of 40 pounds nitrogen per acre following crop harvest is acceptable. Harvest of hay crop will enable phosphorus removal from soil system that may otherwise accumulate from grass decomposition.

Immediate modification of this plan is required due to changes in cropping practices and / or increases in manure / effluent application. Soil analysis is recommended every three years or less to determine the soil fertility and pH. Manure / liquid effluent analysis is recommended at least once a year. Annual soil testing is recommended to track soil phosphorus accumulation.

There is no FSA farm tract of field information available; the field was created from wooded property for the land-application of lagoon effluent generated from the facility. The RWC facility is in the process of force-main installation for inclusion in a central sewer system.

The analytical methods used are from VCE Publication 452-887, *Laboratory Procedures - Virginia Tech Soil Testing Laboratory*, revised 2006. pH determinations by BR on 08-15-11. Elemental analysis by BR on 08-14-11.

[illegible]

Nutrient Management Plan Balance Sheet
(Fall, 2011-Winter, 2012)
Rappahannock Westminster-Canterbury
Planner: Scott Rae (cert. No. 296)

Tract: RWC, Inc Location: Lancaster
 (N = N based, 1P = P based, 1.5P = P based at 1.5 removal, 0P = No P allowed)

Field CFSA No. /Name	Size (ac) Total/ Used	Yr.	Crop	Needs N-P-K (lbs/ac)	Leg /Man Resid	Manure/Biosd Rate & Type (season)	IT (d)	Man/Bios N-P-K (lbs/ac)	Net = Needs - appld N-P-K (lbs/ac)	Sum P rem cred	Commercial N-P-K (lbs/ac)	Notes
0/Irrigated Fall 2010 (N)	15/15	2012	Fescue grass hay mt.	90-80-170	0/0	500 k Irriga (Sp) 600 k Irriga (Su) 500 k Irriga (Fa)	N/A	7-30-90 6-25-75 6-25-75	70-0-(70)	N/A		1,2

Commercial Application Methods:

br - Broadcast ba - Banded sd - Sidedress

Notes:

- 1 Apply additional nitrogen (liquid / urea) in the Spring to meet crop needs.
- 2 Application to occur throughout season at alternating times; limit application to half-an-inch per application period. Do not apply to point of ground saturation.

Irrigation / Fertilization Schedule

Irrigate
Do Not Irrigate

JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC

Notes:

- 1 Refer to Special Conditions pages for additional information.
- 2 Do not apply / irrigate to frozen or snow-covered ground.

Application Summary Report

2012: Fescue grass (hay), maint.

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	Lime (tons)
RWC, Inc	IrrigatedFall2010	14.5	500.0k Irrig(Sp) 600.0k Irrig(Su) 500.0k Irrig(Fa)				

Field Productivities for Grass Crops

Tract Name	Tract/ Field	Field Name	Acres	Predominant Soil Series	Grass Hay	Environmental Warnings
RWC, Inc	0/0	IrrigatedFall2010	14.5	Kempsville	II	

Yield Range

Field Productivity Group	Alfalfa Tons/Acre	Grass/Hay Tons/Acre
I	>6	>4.0
II	4-6	3.5-4.0
III	<4	3.0-3.5
IV	NA	<3.0
V	NA	NA

Manure Production Summary

Manure Name: Irrigation Water

Animal Summary

Other: 0

Manure Storage Capacity: 3990. kgals

Manure Analysis:

TKN: .05

P2O5: .05

NH4: .02

K2O: .15

Plant Available Nutrients:

Immediate Incorporation:

.02 lbs N

.05 lbs P2O5

.15 lbs K2O

Surface Applied:

.01 lbs N

.05 lbs P2O5

.15 lbs K2O

Residual N:

yr 1: .00 lbs

yr 2: .00 lbs

yr 3: .00 lbs

Manure Production

Dec-Feb 496

Mar-May 496

Jun-Aug 496

Sep-Nov 496

Total Produced: 1984

Manure Sold/yr: 0

Manure purch./yr: 0

Liquid Manure Production Details

production [kgal/yr] = (# confined)[animals] * (avg wt)[animal-lbs/animal] * (prod factor)[gal/yr/animal-lb] * (0.001)[kgal/gal] + (# confined)[animals] * (waste-water)[gal/day/animal] * (365)[day/yr] * (0.001)[kgal/gal]

Group Name	Production [determined from RWC 2010 Annual Report, Part B, Operating Data]
RWC Waste Water	9,651,540

Net Precipitation Excess

NPE [kgal/yr] = {precip (42.[in/yr]) - evap (39.[in/yr])} * pit/lagoon factor (0.9) * surface area (182879.[sq-ft]) * (1/12)[ft/in] * (7.48)[gal/cu-ft] * (0.001)[kgal/gal] = 786.56[kgal/yr]

Manure Spreading Summary

Season	Manure	Rate/ac	Tract	Field	Acres	Crop	Total in Field	Running Total
2012Sp	Irrigation Water	500.0 kgals	RWC, Inc	IrrigatedFall2010	15	Fescue grass (hay), maint	7250 kgals	7250 kgals
2012Su	Irrigation Water	600.0 kgals	RWC, Inc	IrrigatedFall2010	15	Fescue grass (hay), maint	8700 kgals	8700 kgals
2012Fa	Irrigation Water	500.0 kgals	RWC, Inc	IrrigatedFall2010	15	Fescue grass (hay), maint	7250 kgals	7250 kgals

Nutrient Management Plan Special Conditions for Nutrient Management Plans Developed for Biosolids Applications

July 2008

The following management practices will be utilized for operations using biosolids:

1. Soil samples for biosolid application fields will be analyzed at least once every three (3) years for pH, phosphorus, potassium, calcium, and magnesium in order to maximize the efficient utilization of nutrients. A representative soil sample of each field representing an area up to approximately twenty acres will be comprised of cores randomly sampled throughout the field. Soil sampling core depth will be from 0-4 inches for land that has not been tilled within the past three years, or 0-6 inches for land that has been tilled within the past three years. Soil pH will be maintained at approximate agronomic levels to promote optimum crop growth and nutrient utilization.
2. Application rates for alkaline stabilized biosolids shall be restricted in accordance with a lime requirements test determined by commercial or state soil testing laboratories listed in #3 below. Calcium carbonate equivalent loadings shall not exceed rates expected to attain soil pH values in the plow layer above 6.5 for soils located in the coastal plain and above 6.8 for soils located in other areas of the state.
3. Soil test analysis will be performed by one of the laboratories listed below. Soil phosphorus levels must be determined using the Mehlich I or Mehlich III procedure:
 - A&L Agricultural Laboratories
 - Spectrum Analytical Laboratories
 - Brookside Laboratories
 - Virginia Tech Soil Testing Lab
 - Waters Agricultural Laboratories
4. The actual biosolids application rates shall be based on the annual average sludge quality. The average sludge quality shall be established from the results of approved analytical testing of composite samples obtained during the most recent 12 months of monitoring. For proposed treatment works rates may be initially based on the biosolids characteristic produced by similar generating facilities. At a minimum, representative biosolids samples will be analyzed at the frequency and for the parameters specified in the VPA or VPDES Permit. These include but are not limited to: total nitrogen or total Kjeldahl nitrogen, ammonia-nitrogen, total phosphorus, total potassium, calcium carbonate equivalency, and percent solids. Biosolids analysis results will be used to determine actual application rates that do not exceed the nitrogen, phosphorus, and lime application rates specified in the nutrient management plan.
5. All crops will be planted and harvested in a timely manner using commercially acceptable management practices.
6. Make biosolids applications at or near planting or to existing actively growing crops to assure that nutrients are properly utilized. Utilize the spreading schedule contained in the nutrient management plan to determine appropriate biosolids application times and rates. Additional commercial fertilizer applications (especially nitrogen) should be made as a split application separate from the biosolids application, either as a sidedress or topdress application.

7. Biosolids Spreading Schedule.

BIOSOLIDS SPREADING SCHEDULE

CROP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Alfalfa												
Bermuda Grass												
Corn												
Soybeans												
Hay												
Pasture*												
Sorghum/Millet												
Small Grain												

Note: Late fall and winter biosolids applications may be made to a trap crop only if applications are in accordance with 4VAC5-15.
* Cool season grasses only, Fescue and/or Orchardgrass



Spread liquid or dewatered biosolids at the rates and times specified in the nutrient management plan.



Do not spread liquid or dewatered biosolids during these shaded time periods.



Applications during these time periods shall comply with the following:

- Biosolids applications will not be made earlier than 30 days prior to planting on environmentally sensitive sites.
- On fields not listed as environmentally sensitive:
 - Applications of dewatered anaerobically digested or dewatered lime stabilized biosolids will not occur more than 90 days prior to spring planting on fields having (i) slopes less than 7% throughout the application area or (ii) having at least 60% uniform ground cover from crop residue.
 - Liquid biosolids applications will not occur more than 60 days prior to spring planting.



Biosolids applications should be avoided whenever possible during this period (late fall-winter). Fields must have greater than 60% uniform live cover with plant height greater than three (3) inches. Applications made to cool season grass hay and pasture, if applied after 9/1 of any year until 3/1 of the following year, shall not exceed 1/2 of the total nitrogen rate

As stipulated in 4VAC5-15, applications of sewage sludge to environmentally sensitive sites shall fully comply with these timing requirements immediately upon implementation of these timing requirements on nonenvironmentally sensitive sites shall be required for sewage sludge applications on January 1, 2009, and thereafter.

8. For permanent hay or pasture, an adequate stand of hay and/or pasture crop species will be established prior to land application of biosolids. Commercially acceptable stands of the listed species will be maintained and other weeds and grasses controlled. All hay crops will be harvested in a timely and regular manner, removed from fields, and utilized for a suitable purpose.
9. Biosolids will be applied to application sites in a uniform manner.
10. **Do not spread biosolids within the following setback areas or as specified in the permit:**

Minimum distances to Land Application Area			
Adjacent Features	Surface Application (ft) ⁽¹⁾	Incorporation (ft)	Winter (ft) ⁽²⁾
Occupied Dwellings	200	200	200
Water Supply wells and springs	100	100	100
Property Lines	100	50	100
Perennial streams and other surface waters except intermittent streams	50	35	100
Intermittent streams/drainage ditches	25	25	50
All improved roadways	10	5	10
Rock outcrops	25	25	25
Limestone rock outcrops and sinkholes	25	25	25
Agricultural drainage ditches with slopes equal to or less than 2.0%	10	5	10

Notes:

(1) Not plowed or disked to incorporate within 48 hours

(2) Application occurs on average site slope greater than 7.0% during the time between November 16 of one year and March 15 of the following year

In cases where more than one buffer distance is involved, only the single most restrictive distance shall be used.

11. Field Management Practices and Restrictions:

- Biosolids application shall not be made during times when the seasonal high water table of the soil is within 18 inches of the ground surface.
- Biosolids may only be applied to snow-covered ground if the snow cover does not exceed one inch and the snow and biosolids are immediately incorporated within 24 hours of application.
- Liquid sludges (above 85.5% moisture content) shall not be applied to frozen ground. Dry or dewatered sludges may be applied to frozen ground only if the field has: slopes not greater than 5.0%, 60% uniform ground cover from crop residue or an existing actively growing crop such as a small grain or fescue with exposed plant height of three inches or more, a minimum of a 200-foot vegetated or adequate crop residue buffer between the application area and all surface water courses, and soils characterized by USDA as "well drained".

- Waste shall not be applied in areas subject to concentrated flow generated by runoff from storm events such that it would discharge into sinkholes in the area.
 - To avoid runoff from application fields, do not spread biosolids on soils that are saturated. If overland flow of liquid biosolids which could reach buffer areas is observed, reduce the application rate immediately to prevent runoff.
 - The application rate of all application equipment shall be routinely measured as described in an approved sludge management plan and every effort shall be made to ensure uniform application of biosolids within sites in accordance with approved maximum design loading rates.
 - Liquid sludges shall not be applied at rates exceeding 14,000 gallons per acre, per application. Sufficient drying times shall be allowed between subsequent applications.
 - Application vehicles should be suitable for use on agricultural land. Pasture and hay fields should be grazed or clipped to a height of approximately four and six inches, respectively, prior to biosolids application unless the biosolids can be uniformly applied so as not to mat down the vegetative cover so that the site vegetation can be clipped to a height of approximately four inches within one week of the biosolids application. If application methods do not result in a uniform distribution of biosolids, additional operational methods shall be employed following application such as dragging with a pasture harrow, followed by clipping if required, to achieve a uniform distribution of the applied biosolids.
12. Nutrient management plans that contain fields in which row crops will be grown will be revised at least once every three (3) years. Nutrient management plans that contain only hay or pasture fields will be revised at least once every five (5) years. Any such plan revisions will be submitted to DCR and the farm operator within two weeks of the revision per 4VACS-15-100 C.
13. Biosolids applications on CRP or CREP lands must be pre-approved by NRCS and an appropriate conservation plan and NMP must be in place prior to application.
14. This nutrient management plan should be amended or modified by the certified planner who developed the initial plan if:
- additional imported manure, biosolids, or industrial waste that was not identified in the existing plan is applied to fields under the control of the operator;
 - available land area for the utilization of biosolids decreases below the level necessary to utilize biosolids in the plan;
 - cropping systems, rotations, tillage, or fields are changed where phosphorus will be applied at levels greater than crop nutrient needs based on soil analysis; or actual biosolids nutrient applications are significantly more or less than the original planned applications, such that any needed supplemental nutrient applications (from any source) would need to be amended to achieve the appropriate loading rate and yield goals.
15. Any requirements of a permit issued by DEQ, which are more restrictive, supercede these Special Conditions.

ANNUAL REPORT

Part C

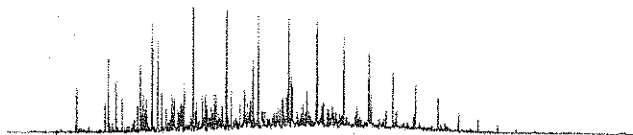
Agronomic Practices

The final disposal of effluent is accomplished by spray irrigation onto the Land Application Field. The crop is a mixture of Kentucky 31 Tall Fescue, Orchard Grass, and Reed Canary Grass.

The field remains in good condition. RW-C harvested an excellent hay crop in June 2010. 25.6-tons of high quality hay were removed from the land application field amounting to 1,025 50-pound hay bales.

No fertilizers were applied to the field in 2010.

7423 Lee Davis Road • Mechanicsville, VA 23111 • Telephone (804) 559-9004 • Fax (804) 559-9306



ANALYTICAL LABORATORY REPORT

27-Sep-11

Long & Associates
Attn: Cody Long
P.O. Box 300
Aylett, VA 23009

Project: (RWC) Rappahannock Westminister Canterbury
Date Received: 20-Sep-11
Date Sampled: 20-Sep-11
Work Order No: 1109185-01
Client ID: Effluent

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
Total Residual Chlorine	2.50	0.01	mg/L	4500CL G	20-Sep-11	PB
% Solids	48.5	1.0	%	Gravimetric	22-Sep-11 at 14:00	HV
Metals						
Calcium	10.80	0.05	mg/L	3120 B	27-Sep-11	HV
Magnesium	1.29	0.02	mg/L	3120 B	27-Sep-11	HV
Potassium	20.3	1.0	mg/L	3120 B	27-Sep-11	HV
Sodium	178.0	10.0	mg/L	3120 B	27-Sep-11	HV

Primary Laboratories, Inc. Results


27-Sep-11

Project: (RWC) Rappahannock Westminister Canterbury
 Date Received: 20-Sep-11
 Date Sampled: 20-Sep-11
 Work Order No: 1109185-02
 Client ID: Land Application Field

Test Description	Final Result	Reporting Limit	Units of Measure	Method Numbers*	Date Analyzed	Tech. Initials
Exchangeable Calcium	72.2	NA	ppm	Mehlich 3	23-Sep-11	SC**
Exchangeable Sodium	0.7	NA	ppm	Mehlich 3	23-Sep-11	SC**
Chromium	6.0	-	mg/L	SW-846 6010C	23-Sep-11	SC**
Manganese	80.0	-	mg/L	Mehlich 3	23-Sep-11	SC**
Texture Analysis	sandy loam	-	-	-	23-Sep-11	SC**

** Analysis sub-contracted to A&L Laboratories, Inc.

* All methods are Standard Methods 18th Edition unless otherwise noted.

Signature: 

Date: 9/27/11

Parry L. Bragg
Laboratory Manager

These analytical results are based upon materials provided by the client and are intended for the exclusive use of the client. These analytical results represent the best judgement of Primary Laboratories, Inc. Primary Laboratories, Inc. assumes no responsibility, express or implied, as to the interpretation of the analytical results contained in this report. This report is not to be reproduced except with the written approval of Primary Laboratories, Inc.

Report Number

11-265-0685

Page: 1 of 1

Account Number

74017

Send To: PRIMARY LABORATORIES

7423 LEE DAVIS RD

MECHANICSVILLE, VA 23111

Client: PLL-1109185

Submitted By: DAVID STONEMAN

Purchase Order:

Report Date: 9/27/2011

Date Received: 9/22/2011



A&L Eastern Laboratories, Inc.

7621 Whitepine Road Richmond, Virginia 23237 (804) 753-5401 Fax (804) 271-5446

REPORT OF ANALYSIS

Total Chromium

SW 6049C

Lab No

Sample ID

Sample Date and Time

17771

1109185-02

parm

6

Method References:

Methods of Soil Analysis, Part 1 - Physical and Mineralogical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, page 404-408.

USEPA, SW-846, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, 3rd Ed. Current Revision

Paulie McGroary

Paulie McGroary

Sample results are reported 'as received' and are not moisture corrected unless noted

Report Number: 11-265-0685
Account Number: 74017



A&L Eastern Laboratories, Inc.

1571 Sandstone Road, Richmond, Virginia 23227 (804) 743-3411 Fax (804) 771-0445

Send To: PRIMARY LABORATORIES
7423 LEE DAVIS RD
MECHANICSVILLE VA 23111

Order: PLL-1109185

Submitted By: DAVID STONEMAN
Farm ID:

SOIL ANALYSIS REPORT

Analytical Method(s):
Mehlich 3

Date Received: 08/22/2011 Date of Analysis: 08/23/2011 Date of Report: 08/27/2011

Sample ID Field ID	Lab Number	Organic Matter		Phosphorus		Potassium		Magnesium		Calcium		Sodium		pH		Acidity	C.E.C	
		%	Rate lb/a	ENR lb/a	Mehlich 3 ppm	Rate ppm	Reserve ppm	Rate ppm	Mg ppm	Rate ppm	Ca ppm	Rate ppm	Na ppm	Soil pH	Buffer Index			
1109185-02	17771	2.2	L	80	84	H		173	H	265	H	1415	H	16	VL	7.2	0.0	0.8

Sample ID Field ID	Percent Base Saturation				Nitrate		Sulfur		Manganese		Iron		Copper		Soluble Salts		Chloride		Aluminum
	K %	Mg %	Ca %	Na %	NO ₃ -N ppm	Rate ppm	S ppm	Rate ppm	Zn ppm	Rate ppm	Mn ppm	Rate ppm	Fe ppm	Rate ppm	Cu ppm	Rate ppm	B ppm	Rate ppm	
1109185-02	4.5	22.5	72.2	0.7	0.0		11	L	2.3	M	80	VH					0.6	M	

Values on this report represent the plant available nutrients in the soil. Rating after each value: VL (Very Low) L (Low) M (Medium) H (High) VH (Very High) ENR - Estimated Nitrogen Release. C.E.C. - Cation Exchange Capacity.

Explanation of symbols: % (percent), ppm (parts per million), lbs/A (pounds per acre), micron (millionths per centimeter), meq/100g (milliequivalent per 100 grams). Conversions: ppm x 2 = lbs/A. Soluble Salts meq/L x 8.49 = ppm.

The report applies to samples collected. Samples are returned a maximum of thirty days after testing.

Analytical Method(s): Mehlich 3

by: *David Stoneman*

Paula McGowan



WWW.A&LESTH.COM

A&L Eastern Laboratories, Inc.

7621 Whitpain Road, Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6446

TEXTURE ANALYSIS

Client:	Grower:	Report No:
PRIMARY LABORATORIES	PLL-1109185	11-265-0685
7423 LEE DAVIS RD		Cust No: 74017
		Date Printed: 09/27/2011
MECHANICSVILLE, VA 23111		Page: 1 of 1
	Farm:	Submitted By: AVID STONEMAN
		Date Received: 09/22/2011

<u>Lab</u> <u>No</u>	<u>Field ID</u>	<u>Sample</u> <u>Identification</u>	<u>Percent</u> <u>Sand</u>	<u>Percent</u> <u>Silt</u>	<u>Percent</u> <u>Clay</u>	<u>Textural</u> <u>Classification</u>
17771		1109185-02	56.0	31.2	12.8	Sandy Loam

Primary Laboratories
7423 Lee Davis Road
Mechanicsville, VA 23111
TEL: (804) 559-9004
FAX: (804) 559-9306

CHAIN OF CUSTODY #: 1 OF 1

**VIRGINIA POLLUTION ABATEMENT
PERMIT APPLICATION
FORM D
MUNICIPAL EFFLUENT AND BIOSOLIDS**

PART D-I LAND APPLICATION OF MUNICIPAL EFFLUENT

PART D-II LAND APPLICATION OF BIOSOLIDS

PART D-III EFFLUENT CHARACTERIZATION FORM

PART D-IV BIOSOLIDS CHARACTERIZATION FORM

PART D-V NON-HAZARDOUS WASTE DECLARATION

PART D-VI BIOSOLIDS APPLICATION AGREEMENT

Contact the Department of Environmental Quality's Regional office if instructions beyond those provided in the form are required.

Department of Environmental Quality

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-I LAND APPLICATION OF MUNICIPAL EFFLUENT

General Information

1. Facility Name. Name given on Form A.
2. Briefly describe the design and provide a line drawing of the wastewater treatment facility which relates the various components of the treatment system including source(s), treatment unit(s) disposal alternatives and flow estimates from the various process units.
3. Briefly describe the disposal of any solid or sludge waste materials.
4. List all industrial contributors to the wastewater treatment facility.
5. Submit a copy of any leasing agreements related to the treatment works and the use or management of the application fields not under direct ownership of the applicant.
6. All Privately Owned Treatment Works (PVOTW) designed to serve 50 or more residences must be registered with the State Corporation Commission (SCC) prior to applying for a permit. Provide a copy of the SCC Certificate of Incorporation (for Virginia based operations) or the Certificate of Authority (for out of state operations) with the application.

Design Information

Note: This section should be completed for each alternative effluent application system.

Waste Characterization

7. Provide the design flow of the wastewater treatment plant.
8. Provide a sewage effluent characterization in accordance with Part D-III of the application. For a proposed facility, estimates based on data obtained from other similar facilities may be used. More than one sample may be required if the effluent may be expected to exhibit diurnal or seasonal variation.
9. Provide calculations describing the nutrient value of the effluent as mg/l nitrogen (PAN), phosphorus (P_2O_5), potassium (K_2O) and any liming effects which may occur from land application.

Storage and Land Application Requirements

10. Provide calculations justifying storage and land area requirements for wastewater application including an annual water balance on a monthly basis incorporating such factors as precipitation, evaporation, evapotranspiration, soil hydraulic conductivity, wastewater loading, dry periods, and monthly storage (input and drawdown). Provide daily, weekly and annual hydraulic loading rates (maximum and average).

All facilities must be designed and operated to prevent any discharge to State waters except in the event of a 25 year, 24 hour or greater storm event. DEQ recommends the storage capacity be sufficient to store the entire daily design flow of the treatment works for the duration of the winter months, when land application may be restricted, with a minimum of 60 days storage capacity where adequate climatological data are not available.

11. Provide calculations justifying the land area requirements for land application of sewage effluent taking into consideration average productivity group, crop(s) to be grown and most limiting factor(s), specifically PAN,

metal loadings, and Sodium Adsorption Ratio (SAR) or Exchangeable Sodium, where applicable. Demonstrate the most limiting factor for land application on an annual and site life basis.

Site Characterization

Note: A site characterization is required for each land application site on a field by field basis and for each storage facility. Site booklets organized by Operator/Land Owner and County are preferred.

Divide the land application site into individualized units of fields on the basis of agronomic management practices. For example, soils which are similar for productivity or pH adjustment which are adjacent to each other should be grouped as one field if they can be anticipated to receive effluent on similar schedules. Distinctly different soils which may require different agronomic management should be designated separately. For convenience in meeting permit reporting requirements, keep field units small.

12. Provide a general location map which clearly indicates the location of all the land application sites related to this permit application. (See General Instructions for Map Requirements.)
13. Provide a topographic map of sufficient scale (5 foot contour preferred) clearly showing the location of the following features within 0.25 mile of the site. More than one map may be required if the land application site(s) or treatment/storage facilities are not in close proximity. Provide a legend and approximate scale. Clearly mark field and property boundaries. (See Instructions for map requirements.)
 - a. Proposed or existing ground water monitoring wells
 - b. General direction of ground water movement
 - c. Water wells, abandoned or operating
 - d. Surface waters
 - e. Springs
 - f. Public water supply(s)
 - g. Sinkholes
 - h. Underground and/or surface mines
 - i. Mine pool (or other) surface water discharge points
 - j. Mining spoil piles and mine dumps
 - k. Quarry(s)
 - l. Sand and gravel pits
 - m. Gas and oil wells
 - n. Diversion ditch(s)
 - o. Agricultural drainage ditch(s)
 - p. Occupied dwellings, including industrial and commercial establishments
 - q. Landfills or dumps
 - r. Other unlined impoundments
 - s. Septic tanks and drainfields
 - t. Injection wells
 - u. Rock outcrops
14. For each land application site, provide a site plan, preferably topographically based, of sufficient detail to clearly show any landscape features which require buffer zones or may limit land application. Clearly show the field boundaries, property lines, and the location of any subsurface agricultural drainage tile, as appropriate.

Provide a site plan legend which identifies the following landscape features:

- a. Drainage ways
- b. Rock outcrops
- c. Sink holes
- d. Drinking water wells and springs
- e. Monitoring wells
- f. Property lines
- g. Roadways
- h. Occupied dwellings
- i. Slopes (greater than 8% by slope class)
- j. Wet spots
- k. Severe erosion

- l. Frequently flooded soils (SCS designation)
- m. Surface waters

15. Provide a detailed soil survey map, preferably photographically based, with the field boundaries clearly marked. (A USDA-SCS soil survey map should be provided, if available.)

Provide a detailed legend for each soil survey map which uses accepted USDA-SCS descriptions of the typifying pedon for each soil series (soil type). Complex associations may be described as a range of characteristics. Soil descriptions should include the following information:

- a. Soil symbol
- b. Soil series, textural phase and slope class
- c. Depth to seasonal high water table
- d. Depth to bedrock
- e. Estimated productivity group (for the proposed crop rotation).
- f. Estimated infiltration rate (surface soil)
- g. Estimated permeability of most restrictive subsoil layer

16. Representative soil borings and test pits to a depth of five feet or to bedrock if shallower, are to be coordinated for the typifying pedon of each soil series (soil type). Soil descriptions shall include as a minimum the following information:

- a. Soil symbol
- b. Soil series, textural phase and slope class
- c. Depth to seasonal high water table
- d. Depth to bedrock
- e. Estimated productivity group (for the proposed crop rotation).
- f. Estimated infiltration rate (surface soil)
- g. Estimated permeability of most restrictive subsoil layer

17. Collect and analyze soil samples for the following parameters for each field, weighted to best represent each of the soil borings performed for Item 16.

- a. Soil organic matter (%)
- b. Soil pH (std. units)
- c. Cation exchange capacity (meg/100g)
- d. Total nitrogen (ppm)
- e. Organic nitrogen (ppm)
- f. Ammonia nitrogen (ppm)
- g. Nitrate nitrogen (ppm)
- h. Available phosphorus (ppm)
- i. Exchangeable sodium (mg/100g)
- j. Exchangeable calcium (mg/100g)
- k. Copper (ppm)
- l. Nickel (ppm)
- m. Zinc (ppm)
- n. Cadmium (ppm)
- o. Lead (ppm)
- p. Chromium (ppm)
- q. Manganese (ppm)
- r. Particle size analysis or USDA textural estimate (%)
- s. Hydraulic conductivity (in/hr.)

Crop and Site Management

18. Relate the crop nutrient needs to anticipated yields, soil productivity rating and the various fertilizer or nutrient sources from effluent and chemical fertilizers.

If the effluent may be expected to possess unusual properties, provide a description of any plant tissue testing, supplemental fertilization or intensive agronomic management practices which may be necessary.

19. Using a narrative format and referencing any related charts, describe the proposed cropping system. Show how the crop rotation and management will be coordinated with the design of the land application system. Include any supplemental fertilization program, and the coordination of tillage practices, planting and harvesting schedules and timing of land application.

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-II LAND APPLICATION OF BIOSOLIDS

General Information

1. Facility name. (Should be the same name given on Form A).
2. Provide a **general** description of the proposed operation including: name, VPDES (or NPDES) permit number, and location of the generators and owners involved, biosolids treatment and handling processes, means of biosolids transport or conveyance, location and volume of storage proposed, general location of sites proposed for application and methods of biosolids application proposed. A description of temporary storage methods should be provided.
3. Provide a legible copy of any leasing agreements necessary for the operation of the treatment or storage facilities, not under direct ownership of the applicant, which identifies the involved parties.
4. For the storage of biosolids, provide evidence of certification by the local government of the locality in which the biosolids are to be stored that the storage site is consistent with all applicable ordinances. Evidence of certification shall consist of the following:
 - a. A copy of the certification from the local government confirming that the storage site is consistent with all applicable ordinances or where the local government fails to respond within 30 days of receiving the request for certification, a copy of the letter from the applicant to the local government requesting certification of the storage facility; **or**
 - b. A copy of the special exception or special use permit from the local government that has adopted and ordinance in accordance with § 62.1-44.19:3.R of the Code of Virginia.
5. Provide to the DEQ and to each locality in which the biosolids are to be applied, written evidence of financial responsibility, including both current liability and pollution insurance, or such other evidence of financial responsibility as the Board may establish by regulation in an amount not less than \$1 million per occurrence, which shall be available to pay claims for cleanup costs, personal injury, bodily injury and property damage resulting from the transport, storage and land application of biosolids in Virginia. The aggregate amount of the applicant's financial liability shall be \$1 million for companies with less than \$5 million in annual gross revenue and shall be \$2 million for companies with \$5 million or more in annual gross revenue.

Design Information

Waste Characterization

6. Provide a biosolids characterization in accordance with Part D-IV for each biosolids. For a proposed facility, estimates based on data obtained from other similar facilities may be used. More than one sample may be required if the biosolids may be expected to exhibit diurnal and seasonal variation.
7. Provide a properly completed Non-Hazardous Declaration Statement for each biosolids, Part D-V.
8. Provide calculations describing the nutrient value of the biosolids as pounds per dry ton nitrogen (PAN), phosphorus (P_2O_5), potassium (K_2O), and Calcium Carbonate Equivalence, if applicable.

Biosolids Storage Facilities

9. Describe the current status of the available biosolids storage facilities. List in a tabular format the biosolids storage facilities by location, total storage capacity(s), and the biosolids contracts currently permitted or

assigned to these facilities.

10. Provide plans and specifications for **routine** and **emergency** storage facilities of all biosolids to be handled that depict the following information:

- a. Site layout on a recent 7.5 minute topographic quadrangle or other appropriate scaled map with the following information:
 - (1) Location of any required soil, geologic and hydrologic test holes or borings
 - (2) Location of the following field features within 0.25 miles of the site boundary (indicated on the map) with the approximate distances from the site boundary.
 - (a) Water wells (operating or abandoned).
 - (b) Surface waters.
 - (c) Springs.
 - (d) Public water supplies.
 - (e) Sinkholes.
 - (f) Underground and/or surface mines.
 - (g) Mine pool (or other) surface water discharge points.
 - (h) Mining spoil piles and mine dumps.
 - (i) Quarries.
 - (j) Sand and gravel pits.
 - (k) Gas and oil wells.
 - (l) Diversion ditches.
 - (m) Occupied dwellings, including industrial and commercial establishments.
 - (n) Landfills - dumps.
 - (o) Other unlined impoundments.
 - (p) Septic tanks and drainfields.
 - (q) Injection wells.
- b. Topographic map (10-foot contour preferred) of sufficient detail to clearly show the following information:
 - (1) Maximum and minimum percent slopes.
 - (2) Depressions on the site that may collect water.
 - (3) Drainage ways that may attribute to rainfall run-on to or runoff from this site.
 - (4) Portions of the site (if any) which are located within the 100-year floodplain.
- c. Data and specifications for the liner proposed for seepage control.
- d. Scaled plan view and cross-sectional view of the facilities showing inside and outside slopes of all embankments and details of all appurtenances.
- e. Calculations justifying impoundment capacity, including freeboard.
- f. A description of supernatant handling and disposal.
- g. Groundwater monitoring plans for the facilities including pertinent hydrogeological data to justify upgradient and downgradient well location and depth.

11. Provide generic plans for on-site **temporary** storage.

12. Provide pertinent calculations justifying biosolids storage based on contractual agreements with biosolids generators, annual biosolids production, land area available, and an annual biosolids balance incorporating such factors as precipitation, evapotranspiration, soil percolation rates, wastewater loading, monthly storage

(input and drawdown).

Biosolids Transport

13. Provide a detailed description for each of the following:

- a. Specifications on all bed and tank vehicles that will be used to transport biosolids from generators or storage to land application sites;
- b. Routes to be used to transport biosolids from the generator(s) to storage unit(s);
- c. Procedures for biosolids off-loading at the biosolids facilities and the land application site together with spill prevention, cleanup, (including vehicle cleaning), field reclamation and emergency spill notification and cleanup measures; and
- d. Voucher system to be used to document transport and delivery of biosolids from their source to the land application site or a facility to further process the biosolids for marketing. Also describe record retention for vouchers.

Field Operations

14. For field operations involving storage, provide a detailed description for each of the following:

- a. Routine storage—biosolids loading of transport vehicles, equipment cleaning, freeboard maintenance, and inspections for structural integrity of the unit.
- b. Emergency storage—procedures for DEQ approval and implementation.
- c. Temporary or field storage—procedures to be followed including either designated site locations provided in the "Design Information" or the specific site criteria for such locations including the liner/cover requirements and the time limit assigned to such use.
- d. Field reclamation of off-loading (staging) areas.

15. For field operations involving the land application of biosolids, provide a detailed description for each of the following:

- a. The biosolids spreader vehicles and the specifications of each vehicle.
- b. Procedures for calibrating each spreader based on the solids content of various biosolids to ensure uniform distribution and appropriate loading rates on a day-to-day basis.
- c. Procedures used to ensure that operations address the following constraints:
 - (1) Application of biosolids to frozen ground, pasture/hay fields, crops for direct human consumption and saturated or ice/snow covered ground; and
 - (2) Maintenance buffer zones, slopes, prohibited access for beef and dairy animals, soil pH requirements, and proper site specific biosolids loading rates on a field-by-field basis.

Land Application Sites

Application Site Information

16. Provide a general location map for each County which clearly indicates the location of all the land application sites related to this permit application within that County and proposed transport vehicle haul routes to be utilized from the biosolids source or storage unit to the sites. (See General Instructions for map requirements.)
17. List by County and owner all of the fields, (net) acreages, and tract number related to this permit application, and the last date of biosolids application. Report the data in the following format:

COUNTY	OWNER	OPERATOR	FIELD *TRACT NO.	ACRES	DATE OF LAST APPLICATION
King	Charles	Bill Jones	1	6.9	8/22/89
George	Jones		2	12.3	8/22/89
*Agricultural Stabilization and Conservation Service tract					

18. Provide a properly completed Biosolids Application Agreement for each land owner, Part D-VI.
19. Provide a legible topographic map with legend of proposed land application sites to scale as needed to depict any landscape features that will require buffer zones or may limit land application. The following landscape features should be delineated. (See General Instructions for map requirements.)
 - a. Drainage ways
 - b. Rock outcrops
 - c. Sink holes
 - d. Water supply wells and springs
 - e. Monitoring wells
 - f. Property lines
 - g. Roadways
 - h. Occupied dwellings
 - i. Slopes
 - j. Wet spots
 - k. Severe erosion (NRCS designation)
 - l. Frequently flooded soils (NRCS designation)
 - m. Surface waters

On the same map, also show the acreage to be amended with biosolids together with the net acres for biosolids application computed.

20. Provide a USDA soil survey map, if available, of proposed sites for land application of biosolids with the field boundaries clearly marked.
21. For each field that will receive biosolids, collect a representative soil sample for analyses of the soil parameters indicated in "Soil Test Parameters for Land Application Sites" of D-II. Results of the soil analyses must be submitted with the permit application.
22. Specify the most limiting factor regarding the rate of biosolids land application among metals loadings, nutrients (i.e., plant available nitrogen or phosphorus), calcium carbonate equivalency (applicable to lime stabilized biosolids), or other. Based on the most limiting factor, provide pertinent calculations justifying the land area requirements for land application of biosolids. Include in these calculations an annual biosolids balance incorporating such factors as precipitation, evapotranspiration, soil percolation rates, wastewater loading, monthly storage (input and drawdown).
23. For all biosolids land application sites that are required to have a nutrient management plan (NMP) approved by the Department of Conservation and Recreation (DCR), provide a copy of the approved NMP and DCR's approval letter for that NMP. DCR's NMP approval is required for specific sites prior to DEQ authorization of the sites. Sites requiring DCR's NMP approval include but are not limited to, sites operated by an owner or lessee of a confined animal feeding operation, as defined in subsection A of § 62.1-44.17.1, or confined poultry feeding operation, as defined in subsection A of § 62.1-44.17.1.1; sites where land application more frequently than once every three years at greater than 50 percent of the annual agronomic rate is proposed, and other sites based on site-specific conditions that increase the risk that land application may adversely impact state waters. Refer to General Instructions of the VPA Permit Application for land application sites requiring both a NMP and DCR's approval of the NMP.

24. Provide one of the following:

- a. Evidence, such as a transmittal letter, indicating that a copy of each DCR approved NMP was provided to the farmer/operator of the site, the DCR Regional Watershed Office and the chief executive officer or designee for the local government; or
- b. A copy of written correspondence to the applicant from the farmer/operator of the site, the DCR Regional Watershed Office and the chief executive officer or designee for the local government, notifying the applicant that they do not want to receive a copy of the NMP.

Frequent Application Site Information

25. For projects receiving frequent applications of biosolids, provide the following additional site information:

- a. Representative soil borings and test pits to a depth of five feet or to bedrock if shallower, for each major soil type and the following tests performed and data collected.
 - (1) Soil type.
 - (2) Soil texture for each horizon (USDA classification).
 - (3) Soil color for each horizon.
 - (4) Depth from surface to mottling and bedrock if less than two feet.
 - (5) Depth from surface to subsoil restrictive layer.
 - (6) Indicated infiltration rate (surface soil).
 - (7) Indicated permeability of subsoil restrictive layer.
- b. Additional soil testing and analytical results specified in "Soil Test Parameters for Land Application Sites" of Part D-II for sites receiving biosolids at "Frequent at Agronomic" rates of application.
- c. Groundwater monitoring plans for the land treatment area including pertinent geohydrologic data to justify upgradient and downgradient well location and depth.

26. For frequent land application sites, include the following additional landscape features with those depicted on the topographic map required per item 19 of Part D-II:

- a. Water wells, abandoned or operating
- b. Underground and/or surface mines
- c. Mine pool (or other) surface water discharge points
- d. Mining spoil piles and mine dumps
- e. Quarry(s)
- f. Sand and gravel pits
- g. Gas and oil wells
- h. Diversion ditch(s)
- i. Agricultural drainage ditch(s)
- j. Occupied dwellings, including industrial and commercial establishments
- k. Landfills or dumps
- l. Other unlined impoundments
- m. Septic tanks and drainfields
- n. Injection wells

SOIL TEST PARAMETERS FOR LAND APPLICATION SITES⁽¹⁾

Parameter	BIOSOLIDS APPLICATION			STORAGE
	Infrequent ⁽²⁾	Frequent Below Agronomic Rates ⁽²⁾	Frequent at Agronomic ^{(2) (3)}	Supernatant ⁽⁴⁾
Soil Organic Matter (%)			*	*
Soil pH (Std. Units)	*	*	*	*
Cation Exchange Capacity (me/100g)			*	
Total Nitrogen (ppm)			*	*
Organic Nitrogen (ppm)			*	*
Ammonia Nitrogen (ppm)			*	
Available Phosphorus (ppm)	*	*	*	*
Exchangeable Potassium (ppm)	*	*	*	
Exchangeable Sodium (mg/100g)			*	*
Exchangeable Calcium (mg/100g)			*	*
Exchangeable Magnesium (mg/100g)	*		*	*
Copper (ppm)			*	*
Nickel (ppm)			*	*
Zinc (ppm)			*	*
Cadmium (ppm)			*	*
Lead (ppm)			*	*
Manganese (ppm)			*	
Molybdenum (ppm)			*	
Selenium (ppm)			*	
Particle Size Analysis or USDA Textural Estimate (%)			*	*
Hydraulic Conductivity (in/hr)				*

⁽¹⁾ Note: Unless otherwise stated, analyses shall be reported on a dry weight basis(*).

⁽²⁾ See 9 VAC 25-32-500.B.3.

⁽³⁾ Testing requirements to be adjusted in accordance with prior analytical test results. Heavy metal analyses are not required but once every three years before application.

⁽⁴⁾ Liquid biosolids derived from biosolids use facilities.

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-III EFFLUENT CHARACTERIZATION FORM

1. Facility Name: Rappahannock Westminster-Canterbury WWTF
2. Source or Generator: Residential Life Care Facility
3. Type of Treatment: Aerated Lagoon
4. Degree of Treatment: BOD - 85% TSS - 60%
5. Provide at least one analysis for each parameter listed under effluent. Upon review, additional analyses may be required by DEQ.

<u>Parameter</u>	<u>Effluent</u>	
BOD ₅	<u>57.33</u>	mg/l
TSS	<u>64.4</u>	mg/l
TRC	<u>2.50</u>	mg/l
Percent Solids	<u>48.5</u>	%
pH	<u>7.0</u>	S.U.
Nitrogen, (Nitrate)	<u>0.32</u>	mg/l
Nitrogen, (Ammonium)	<u>2.87</u>	mg/l
Nitrogen, (Total Kjeldahl)	<u>6.5</u>	mg/l
Phosphorus, (Total)	<u>3.01</u>	mg/l
Potassium, (Total)	<u>16.2</u>	mg/l
Sodium	<u>178.0</u>	mg/l

6. Provide at least one analysis of any other pollutants which you believe may be present in the effluent. Upon review, additional analyses may be required by DEQ.

<u>Parameter</u>	<u>Effluent</u>	
Lead	<u>BDL</u>	mg/l Deductible limit = 0.05 mg.
Cadmium	<u>BDL</u>	mg/l Deductible limit = 0.01 mg.
Copper	<u>BDL</u>	mg/l Deductible limit = 0.02 mg.
Nickel	<u>BDL</u>	mg/l Deductible limit = 0.02 mg.
Zinc	<u>0.03</u>	mg/l
Other	<u> </u>	mg/l
	<u> </u>	

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-IV BIOSOLIDS CHARACTERIZATION FORM

1. Facility Name: _____
2. Source or Generator: _____
3. Type of Treatment: _____
4. Biosolids Treatment Classification: _____
5. Describe the method of sludge treatment or stabilization for each biosolids source. Provide a flow diagram of each wastewater treatment plant's residual treatment train and yearly biosolids production. In addition, provide the design flow of each facility.
6. For all biosolids, provide at least one analysis for each parameter. The laboratory analytical data must be representative of biosolids samples collected at the frequencies specified in the table below.

<u>Parameter</u>	<u>Biosolids⁽¹⁾</u>
Percent Solids	_____ %
Volatile Solids	_____ %
pH	_____ S.U.
Alkalinity as CaCO ₃ ⁽²⁾	_____ mg/kg
Nitrogen, (Nitrate)	_____ mg/kg
Nitrogen, (Ammonium)	_____ mg/kg
Nitrogen, (Total Kjeldahl)	_____ mg/kg
Phosphorus, (Total)	_____ mg/kg
Potassium, (Total)	_____ mg/kg
Lead	_____ mg/kg
Cadmium	_____ mg/kg
Copper	_____ mg/kg
Nickel	_____ mg/kg
Zinc	_____ mg/kg
Arsenic	_____ mg/kg
Mercury	_____ mg/kg
Molybdenum	_____ mg/kg
Polychlorinated biphenols	_____ mg/kg
Selenium	_____ mg/kg

⁽¹⁾ Values reported on a dry weight basis unless indicated.

⁽²⁾ Lime treated biosolids (10% or more lime by dry weight) should be analyzed for percent CaCO₃.

7. For Exceptional Quality Biosolids, provide at least one analysis for each parameter. The laboratory analytical data must be representative of biosolids samples collected at the frequencies specified in the table below.

Parameter	Biosolids ⁽¹⁾
Aldrin/dieldrin (total)	_____ mg/kg
Benzo (a) pyrene	_____ mg/kg
Chlordane	_____ mg/kg
DDT/DDE/DDD (total) ⁽²⁾	_____ mg/kg
Dimethyl nitrosamine	_____ mg/kg
Heptachlor	_____ mg/kg
Hexachlorobenzene	_____ mg/kg
Hexachlorobutadiene	_____ mg/kg
Lindane	_____ mg/kg
Toxaphene	_____ mg/kg
Trichloroethylene	_____ mg/kg

⁽¹⁾ Values reported on a dry weight basis unless indicated.

⁽²⁾ Note: DDT = 2,2-Bis (chlorophenyl)-1,1,1-Trichloroethane; DDE = 1,1-Bis (chlorophenyl)-2,2-Dichloroethane; DDD = 1,1-Bis (chlorophenyl)-2,2-Dichloroethane

8. Provide at least one analysis of any other pollutants which you believe may be present in the biosolids. Upon review, additional analyses may be required by DEQ.

Biosolids Sampling Frequency

Amount of biosolids ⁽¹⁾ (metric tons per 365-day period)	Frequency
Greater than zero but less than 290	Once per year
Equal to or greater than 290 but less than 1,500	Once per quarter (four times per year)
Equal to or greater than 1,500 but less than 15,000	Once per 60 days (six times per year)
Equal to or greater than 15,000	Per month (12 times per year)

⁽¹⁾ Either the amount of bulk biosolids applied to the land or the amount of biosolids received by a person who prepares biosolids that is sold or given away in a bag or other container for application to the land (dry weight basis).

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-V NON-HAZARDOUS WASTE DECLARATION

For waste to be land applied, the owner, as defined by 9 VAC 25-32, must sign the following statement.

I certify that the waste described in this application is non-hazardous and not regulated under the Resource Conservation and Recovery Act or the Virginia Hazardous Waste Management Regulation (9 VAC 20-60).


(Signature of Owner)

Date: 8.22.2011

VIRGINIA POLLUTION ABATEMENT APPLICATION

FORM D

MUNICIPAL EFFLUENT AND BIOSOLIDS

PART D-VI BIOSOLIDS APPLICATION AGREEMENT

This biosolids application agreement is made on _____ between _____, referred to here as "landowner", and _____, referred to here as the "Permittee".

Landowner is the owner of agricultural land shown on the map attached as Exhibit A and designated there as _____ ("landowner's land"). Permittee agrees to apply and landowner agrees to comply with certain permit requirements following application of biosolids on landowner's land in amounts and in a manner authorized by (VPA) (VPDES) permit number _____ which is held by the Permittee.

Landowner acknowledges that the appropriate application of biosolids will be beneficial in providing fertilizer and soil conditioning to the property and consents to the application of biosolids on his property. Moreover, landowner acknowledges having been expressly advised that, in order to protect public health:

1. Public access to landowner's land upon which biosolids have been applied should be controlled for at least 30 days following any application of biosolids and no biosolids amended soil shall be excavated or removed from the site during this same period of time unless adequate provisions are made to prevent public exposure to soil, dusts or aerosols;
2. Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface shall not be harvested for 14 months after the application of biosolids. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after the application of biosolids when the biosolids remain on the land surface for a time period of four (4) or more months prior to incorporation into the soil, or 38 months when the biosolids remain on the land surface for a time period of less than four (4) months prior to incorporation. Other food crops, feed crops and fiber crops shall not be harvested for 30 days after the application of biosolids;
3. Following biosolids application to pasture or hayland sites, meat producing livestock should not be grazed or fed chopped foliage for 30 days and lactating dairy animals should be similarly restricted for a minimum of 60 days. Other animals should be restricted from grazing for 30 days;
4. Supplemental commercial fertilizer or manure applications should be coordinated with the biosolids applications such that the total crop needs for nutrients are not exceeded as identified in the nutrient management plan developed by a person certified in accordance with §10.1-104.2 of the Code of Virginia to be supplied to the landowner by the permittee at the time of application of biosolids to a specific permitted site;
5. Tobacco, because it has been shown to accumulate cadmium, should not be grown on landowner's land for three years following the application of biosolids borne cadmium equal to or exceeding 0.45 pounds/acre (0.5 kilograms/hectare).
6. Turf grown on land where biosolids are applied shall not be harvested for one year after application of biosolids when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

Permittee agrees to notify landowner or landowner designee of the proposed schedule for biosolids application and specifically prior to any particular application to landowner's land. This agreement may be terminated by either party upon written notice to the address specified below.

Landowner:

Mailing Address:

Permittee:

Mailing Address:

Rappahannock Westminster-Canterbury WWTF: VPA0091511											
Ground Water Monitoring Analysis: Trend Summary (2008-2011)											
Parameter	Units	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 9	Well 10
Nitrate-Nitrogen	mg/l	Down	Slightly Up	Slightly Down	Flat	Slightly Down	Flat	Flat	Down	Slightly Up	Down
Conductivity	umhos/cm	Down	Down	Slightly Up	Up *	Down	Up	Up	Down	Down	Down
Chlorides	mg/l	Down	Flat	Flat	Flat	Slightly Up	Slightly Down	Slightly Down	Down	Down	Down
Total Recoverable Sodium	mg/l	Down	Slightly Up	Slightly Up	Slightly Up	Flat	Slightly Down	Up	Down	Down	Down
Total Organic Carbon	mg/l	Up	Up	Up	Down	Down	Down	Slightly Down	Down	Flat	Up
pH	s.u.	Down	Down	Down	Down	Down	Down	Flat	Flat	Slightly Down	Slightly Down
Phosphorus	mg/l	Down	Down	Down	Down	Slightly Up	Down	Down	Down	Down	Slightly Down
Total Dissolved Solids	mg/l	Down	Down	Down	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Well #1	2008-1	2008-2	2008-3	2008-4	2009-1	2009-2	2009-3	2009-4	2010-1	2010-2	2010-3	2010-4	2011-1	2011-2
NO3N	1.3	1	0.7	0.3	0.6	1.2	0.2737	0.5	0.4	0.4	0.2	0.6	1.4	0.9
Conductivity	334	342	382	352	273	295	227	227	215	223	164	170	263	284
Chlorides	53	57	46	39	43	39.9	30.3	34.9	40.2	25.3	19.7	22.9	36.51	54.5
TR-NA	60.25	63.75	57.45	62.34	57.57	63.07	53.29	41.92	63.12	44.53	32.57	34.42	54.62	61.7
Total Organic Carbon	2.2	2.1			5.9				2.7				4.2	
pH	5.41	5.65	5.38	5.14	5.62	5.4	5.32	5.12	5				4.96	
Total Phosphorus	0.26	0.19			2.6				0.14				0.1	
Total Dissolved Solids									278				164	
Well #2	2008-1	2008-2	2008-3	2008-4	2009-1	2009-2	2009-3	2009-4	2010-1	2010-2	2010-3	2010-4	2011-1	2011-2
NO3N	0.09	0.2	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.2	0.3	0.2	0.2	0.4
Conductivity	418	432	363	389	371	356	367	392	310	453	430	407	104	447
Chlorides	61	7	58	49	67	61.3	52.6	55	55.5	54.5	48.5	27.3	48.3	57.6
TR-NA	87.19	85.92	77.6	79.04	41.02	89.2	105.3	36.36	82.66	90.15	82.52	97.97	104	105.6
Total Organic Carbon	5.3	4.9			6.6				9.7				11.3	
pH	5.52	5.9	5.55	5.53	5.53	5.72	5.64	5.29	5.6				5.49	
Total Phosphorus	2.26	2.67			2.92				0.44				0.62	
Total Dissolved Solids									240				148	
Well #3	2008-1	2008-2	2008-3	2008-4	2009-1	2009-2	2009-3	2009-4	2010-1	2010-2	2010-3	2010-4	2011-1	2011-2
NO3N	0.11	0.09	0.2	0.2	0.4	2.7	0.1723	0.1	0.009	0.009	0.2	0.2	0.3	0.3
Conductivity	57	80	68	85	95	80	72	62	78	74	94	89	58	106
Chlorides	12	12	13	16	18	11.4	13.4	11.5	26.3	13.9	14.9	16.6	20.6	20.2
TR-NA	7.51	7.71	8.32	9.33	13.16	8.88	9.54	7.05	18.397	6.94	9.93	11.23	12.3	12.68
Total Organic Carbon	0.9	0.09			3.3				0.9				1.3	
pH	4.95	5.09	5.06	4.83	5.05	4.94	4.94	4.68	5.07				4.77	
Total Phosphorus	2.6	0.88							0.21				1.94	
Total Dissolved Solids					88				66				84	
Well #4	2008-1	2008-2	2008-3	2008-4	2009-1	2009-2	2009-3	2009-4	2010-1	2010-2	2010-3	2010-4	2011-1	2011-2
NO3N	0.09	0.2	0.09	0.09	0.09	0.2	0.09	0.2	0.4	0.7	0.6	0.1	0.1	0.3
Conductivity	59	53	46	69	44	37	47	47	40	62	57	80	467	78
Chlorides	8	7	8	7	8	7.7	7.4	8.8	8.2	7.9	6.6	6.9	7.6	8.2
TR-NA	4.7	4.93	5.19	4.33	4.87	5.53	4.95	4.32	5.04	5.06	5.03	5.55	4.58	5.18
Total Organic Carbon	1.7	1.8	2.7	12	2.2	2.9	1.4	1.3	1.5	1.8	3.8	5.6	1.7	2.6
pH	4.83	5.5	5	5.47	5.09	4.9	4.84	4.7	4.74				4.91	
Total Phosphorus	0.2	0.14			0.13			0.78	0.07				0.1	
Well #5	2008-1	2008-2	2008-3	2008-4	2009-1	2009-2	2009-3	2009-4	2010-1	2010-2	2010-3	2010-4	2011-1	2011-2
NO3N	0.4	0.2	1.2	0.1	0.3	0.2	0.09	0.09	0.01	0.09	0.01	0.09	0.09	0.1
Conductivity	322	528	522	402	301	466	330	310	343	498	460	415	194	463
Chlorides	30	40	38	34	33	42.9	37.7	33.6	37.3	40.4	37.5	35.6	39.4	44.7
TR-NA	61.38	101.4	115.42	83.78	52.57	110.3	56.79	56.74	83.49	88.63	45.29	86.73	95.33	104
Total Organic Carbon	2.5	2.7	3.9	12.9	4.6	2.7	3.6	2.1	2.7	4	5	2.9	3.3	2.9
pH	6.07	6.07	5.94	5.89	5.13	5.92	5.6	5.57	5.42				5.39	
Total Phosphorus	0.13	0.11			0.6			2.87	0.1				0.1	

	Well #6	2008-1	2008-2	2008-3	2008-4	2009-1	2009-2	2009-3	2009-4	2010-1	2010-2	2010-3	2010-4	2011-1	2011-2
	NO3N	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.01	0.09	0.01	0.09	0.09	0.09
	Conductivity	249	252	230	234	205	193	190	202	216	320	306	183	382	282
	Chlorides	28	17	23	22	21	17.9	17.9	23.4	26.3	21.6	18.1	12.2	14.9	16.7
Well #6	TR-NA	28.4	12.03	17.53	17.75	6.3	13.09	13.73	20.91	20.3	14.59	19.24	8.35	11.54	11.42
	Total Organic Carbon	5.7	4.3	4.1	5.1	4.8	2.7	2.6	3.3	5.7	3.3	3.4	2.3	4.1	2.4
	pH	5.76	6.63	6.1	5.98	6.13	6.1	6.03	5.73	5.94				5.93	
	Total Phosphorus	5.16	5.81			8.09			1.5	1.23				4.24	
	Well #7														
	NO3N					0.2	0.2	0.09	0.4	0.09	0.01	0.01	0.2	0.09	0.09
	Conductivity					244	206	253	215	234	372	473	378	374	462
	Chlorides					37	33.8	43.5	25.8	43.2	34.9	33.5	30.2	31.2	36
Well #7	TR-NA					52.93	52.31	57.48	45.37	65.24	73.3	119.56	92.52	95.61	120
	Total Organic Carbon					17	5.8	6.5	3.1	4.4	6.3	10.9	3.9	5.7	5.2
	pH					5.38	5.38	5.24	5.15	5.3	5.32	5.34	5.77	5.66	
	Total Phosphorus					16.11			0.33	0.25				0.14	
	Well #8														
	NO3N					0.7	0.7		0.6	0.2	0.2	0.1	0.3	0.5	0.6
	Conductivity					63	35		53	37	48	42.8	40	49	46
	Chlorides					13	8.7		8.2	7.9	7.5	6.7	5.9	6.1	6.3
Well #8	TR-NA					12.84	6.85		6.44	5.71	4.96	4.53	4.63	4.94	5.29
	Total Organic Carbon					11.2	19.9		2.8	1.4	4.3	2.8	0.8	3	1.5
	pH					4.94	4.94		4.76	4.75	4.91	4.82	4.72	4.87	
	Total Phosphorus					9.4			0.29	0.31				1.49	
	Well #9														
	NO3N					0.5	1.1	0.6	1.9	1.7	1.7	0.5	1.8	1.8	1.9
	Conductivity					96	52	88	61	44	55	102	55	56	60
	Chlorides					25	10.8	19.1	6.1	4.4	5.1	13.7	4.4	4.3	4.1
Well #9	TR-NA					17.54	9.11	14.58	2.76	6.45	7.39	10.24	6.85	4.89	7
	Total Organic Carbon					14.2	3.8	5.2	2.6	2.5	2.1	7.3	2	1.8	1.5
	pH					5.04	5.01	4.88	4.77	4.88	4.89	4.84	4.95	4.87	2.4
	Total Phosphorus					16.83			2.23	0.21				1.49	
	Well #10														
	NO3N					0.09	0.8	5.7	0.09	0.09	0.09	0.01	0.09	0.09	0.09
	Conductivity					98	72	102	83	51	81	73	89	67	82
	Chlorides					8	5.9	5.7	5.5	4.4	4	4.7	4.3	3.6	3.9
Well # 10	TR-NA					12.3	9.5	10.75	10.12	9.14	7.5	6.83	11.14	8.41	8.62
	Total Organic Carbon					10.5	10.2	9.9	6.2	11.3	9.9	13.3	13.6	21.8	12.2
	pH					5.37	5.37	5.5	4.9	5.04	5.1	5.07	4.76	5.01	
	Total Phosphorus					0.35			0.05	0.11				0.1	
	Parameter														
	NO3N														
	Conductivity														
	Chlorides														
	TR-NA														
	Total Organic Carbon														
	pH														
	Total Phosphorus														
	Units														
	mg/L														
	umhos/cm														
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	mg/L														
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	mg/L														

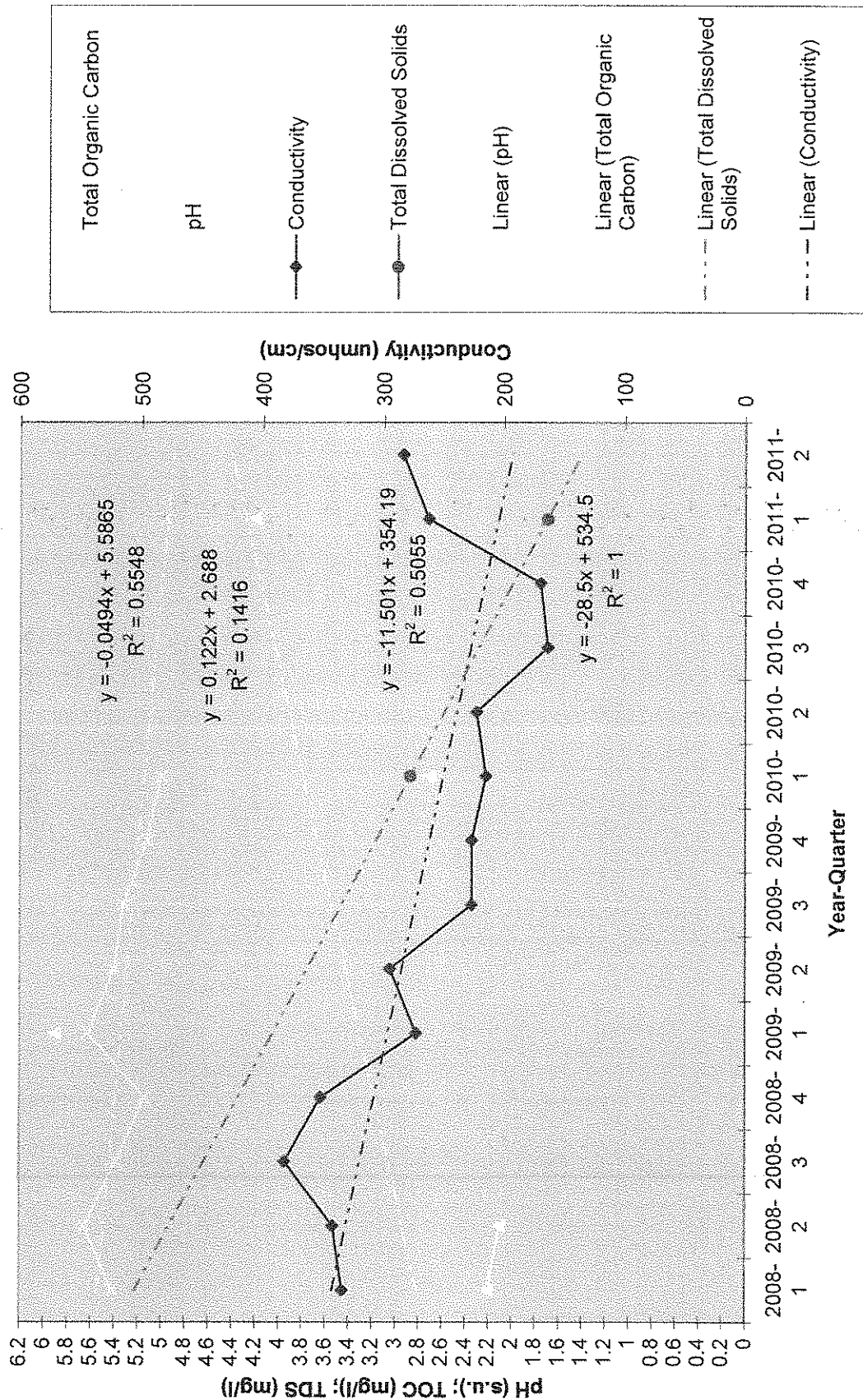
Missing 2010-3 value; calculated average of 2010-2 and 2010-4 for trending

Rappahannock Westminister-Canterbury WWTF: VPA0091511 Ground Water Monitoring Analysis: Trend Summary (2008-2011)						
	Units	Well 1	Well 2	Well 3	Well 4	Well 5
Parameter						
Nitrate-Nitrogen						
Linear Regression Equation	mg/l	Down $y = -0.0122x + 0.79$	Slightly Up $y = 0.0155x + 0.0425$	Slightly Down $y = -0.0114x + 0.4413$	Flat $y = 0.0199x + 0.083$	Slightly Down $y = -0.0381x + 0.4981$
R-squared		0.0166	0.4436	0.0049	0.1711	0.2755
Conductivity						
Linear Regression Equation	umhos/cm	Down $y = -11.501x + 354.19$	Down $y = -4.9473x + 411.32$	Slightly Up $y = 1.1429x + 68.714$	Up * $y = 11.257x + 0.2857$	Down $y = -3.9604x + 426.42$
R-squared		0.5055	0.0582	0.1077	0.1805	0.028
Chlorides						
Linear Regression Equation	mg/l	Down $y = -1.3888x + 49.145$	Flat $y = 0.116x + 49.315$	Flat $y = 0.0261x + 14.206$	Flat $y = -0.0024x + 7.6824$	Slightly Up $y = 0.4473x + 34.061$
R-squared		0.2515	0.001	0.0004	0.0003	0.2197
Total Recoverable Sodium						
Linear Regression Equation	mg/l	Down $y = -1.2608x + 63.07$	Slightly Up $y = 1.7648x + 69.945$	Slightly Up $y = 0.3144x + 7.8547$	Slightly Up $y = 0.0206x + 4.7925$	Flat $y = 0.1307x + 80.58$
R-squared		0.2363	0.1228	0.1755	0.0531	0.0006
Total Organic Carbon						
Linear Regression Equation	mg/l	Up $y = 0.122x + 2.688$	Up $y = 0.555x + 4.23$	Up $y = 0.0364x + 1.0796$	Down $y = -0.0593x + 3.5165$	Down $y = -0.1253x + 4.9253$
R-squared		0.1416	0.9725	0.0229	0.0078	0.0378
pH						
Linear Regression Equation	s.u.	Down $y = -0.0494x + 5.5865$	Down $y = -0.0156x + 5.6676$	Down $y = -0.0189x + 5.0477$	Down $y = -0.037x + 5.2127$	Down $y = -0.0615x + 6.0566$
R-squared		0.5548	0.1259	0.2409	0.2273	0.4718
Phosphorus						
Linear Regression Equation	mg/l	Down $y = -0.0354x + 0.8704$	Down $y = -0.1924x + 2.8364$	Down $y = -0.0376x + 1.6428$	Down $y = 0.003x + 0.2179$	Slightly Up $y = -0.0363x + 0.422$
R-squared		0.0265	0.6776	0.0409	0.0025	0.0223
Total Dissolved Solids						
Linear Regression Equation	mg/l	Down $y = -28.5x + 534.5$	Down $y = -23x + 447$	Down $y = -0.5x + 83.833$	N/A	N/A
R-squared		1	1	0.0291	N/A	N/A

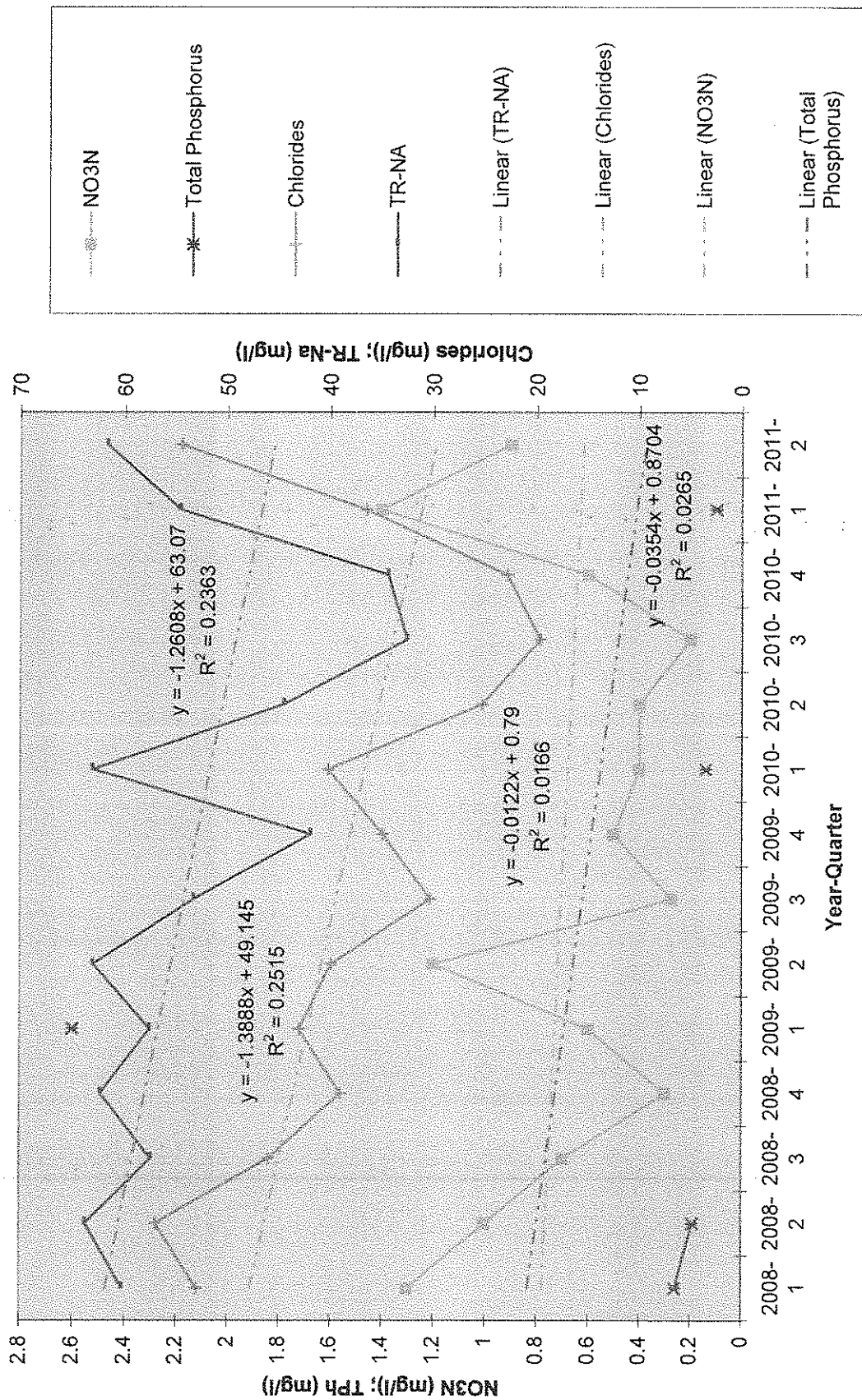
Rappahannock Westminster-Canterbury WWTF; VPA0091511 Ground Water Monitoring Analysis: Trend Summary (2008-2011)				
Parameter	Well 7	Well 8	Well 9	Well 10
Nitrate-Nitrogen				
Linear Regression Equation	Flat $y = -0.0149x + 0.22$	Down $y = -0.0296x + 0.6041$	Slightly Up $y = -1.7188x + 19.153$	Down $y = -0.2016x + 1.8227$
R-squared	0.1501	0.15	0.4969	0.1193
Conductivity				
Linear Regression Equation	Up $y = 28.333x + 165.27$	Down $y = -0.6915x + 49.973$	Down $y = -1.9816x + 77.6$	Down $y = -1.4789x + 87.933$
R-squared	0.7029	0.0603	0.0863	0.0891
Chlorides				
Linear Regression Equation	Slightly Down $y = -0.4782x + 37.54$	Down $y = -0.6151x + 11.365$	Down $y = -1.7188x + 19.153$	Down $y = -0.3806x + 7.0933$
R-squared	0.0698	0.751	0.4969	0.7632
Total Recoverable Sodium				
Linear Regression Equation	Up $y = 7.9549x + 33.68$	Down $y = -0.6344x + 9.9088$	Down $y = -0.8465x + 13.337$	Down $y = -0.3049x + 11.108$
R-squared	0.7492	0.5631	0.3318	0.299
Total Organic Carbon				
Linear Regression Equation	Slightly Down $y = -0.5733x + 10.033$	Down $y = -1.4903x + 13.911$	Flat $y = -0.0552x + 5.9533$	Up $y = 0.8176x + 7.3933$
R-squared	0.1764	0.5289	0.0011	0.371
pH				
Linear Regression Equation	Flat $y = 0.0443x + 5.1717$	Flat $y = -0.0149x + 4.917$	Slightly Down $y = -1.1465x + 5.4587$	Slightly Down $y = -0.0655x + 5.4519$
R-squared	0.3768	0.224	0.3108	0.5483
Phosphorus				
Linear Regression Equation	Down $y = -1.3321x + 12.91$	Down $y = -0.8673x + 7.0969$	Down $y = -1.7832x + 13.66$	Slightly Down $y = -0.0274x + 0.2827$
R-squared	0.5819	0.4464	0.5699	0.4548
Total Dissolved Solids				
Linear Regression Equation	N/A	N/A	N/A	N/A
R-squared	N/A	N/A	N/A	N/A

Rappahannock Westminster-Canterbury WWTF; VPA0091511					
Soil Monitoring Analysis: Trend Summary (2008-2010)					
Parameter	Units	2008	2010	Trend	% Chg
Available Phosphorus	ppm	9	14	Up	56%
CEC	meq/100g	9.2	5.5	Down	-40%
Soil Organic Matter	%	2.7	1.4	Down	-48%
pH	s.u.	5.7	6.3	Up	11%
Organic Nitrogen	mg/kg	480	728	Up	52%
Ammonia Nitrogen	mg/kg	5	1.9	Down	-62%
Nitrate Nitrogen	mg/kg	5	1.3	Down	-74%
Hydraulic Conductivity	in/hr	NA	31.79	Unch	na

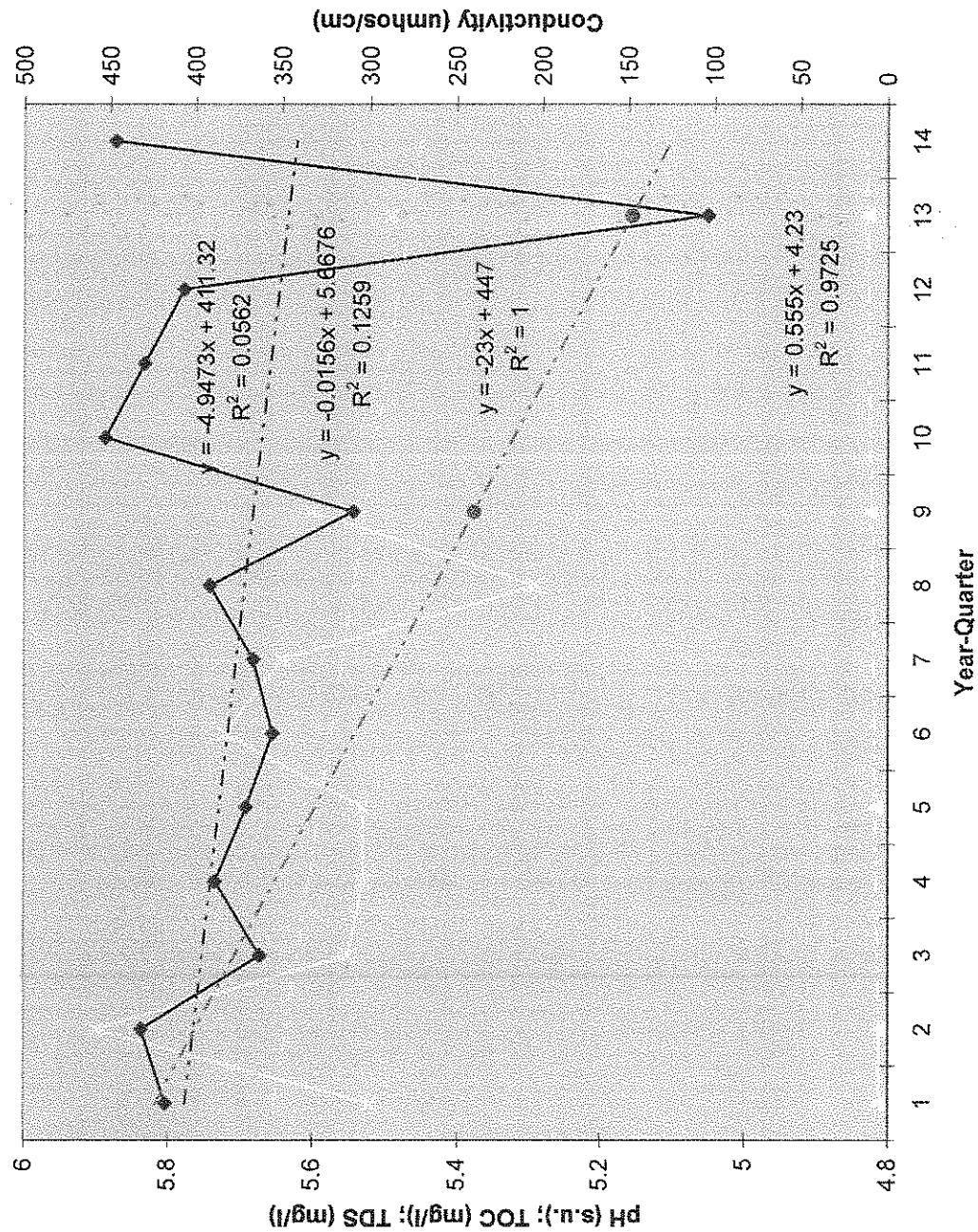
Rappahannock Westminister-Canterbury WWTP VPA 0091511 Well #1



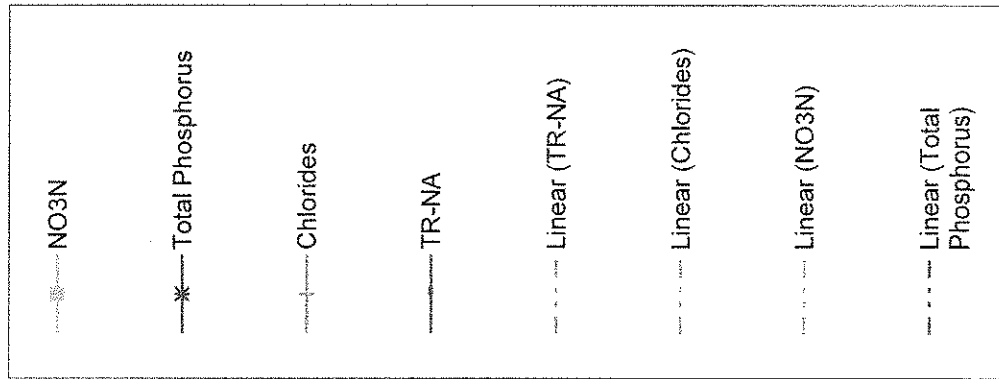
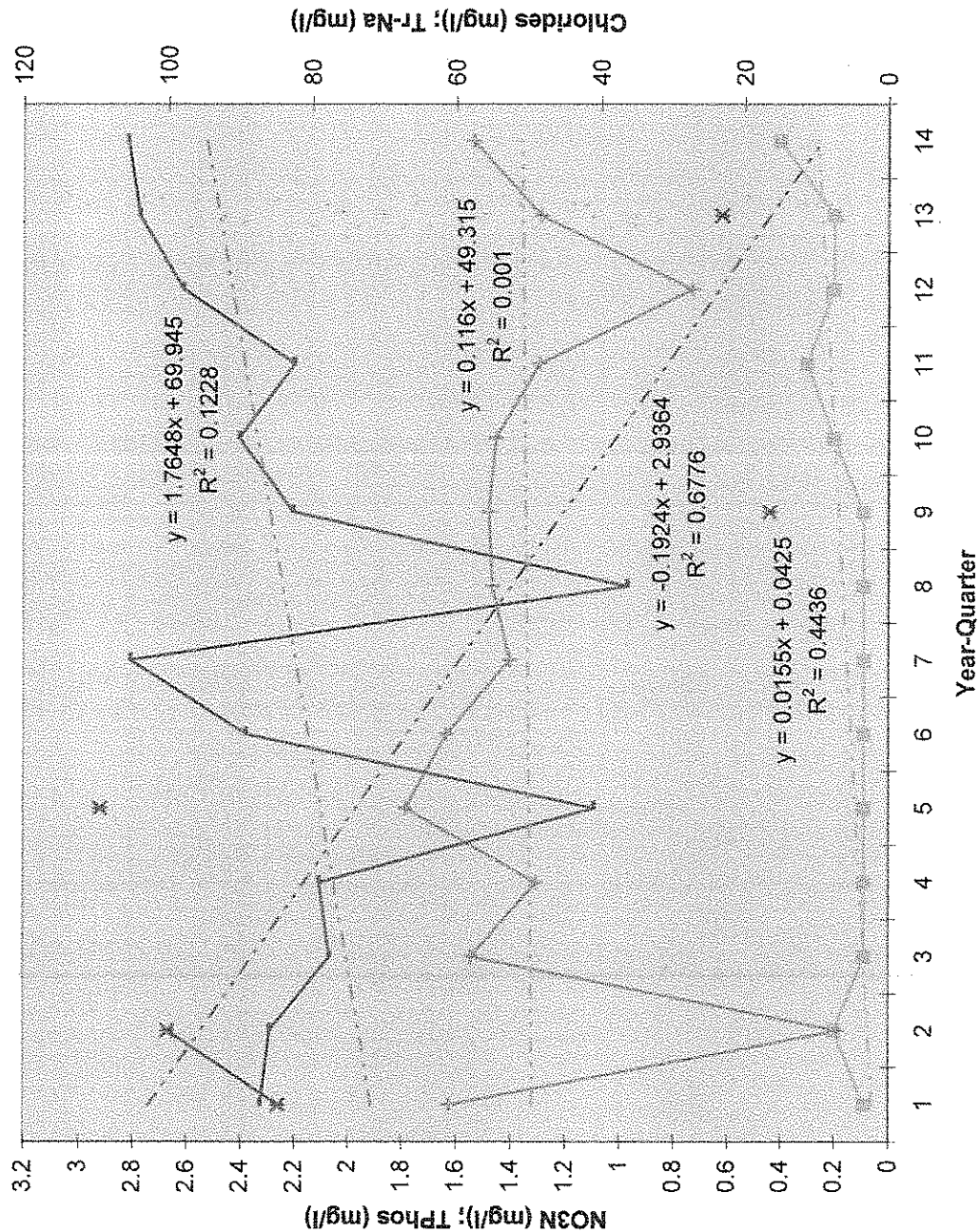
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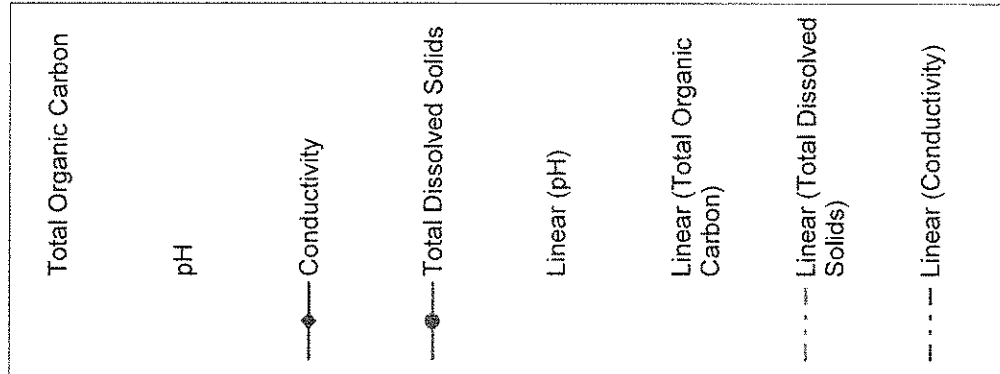
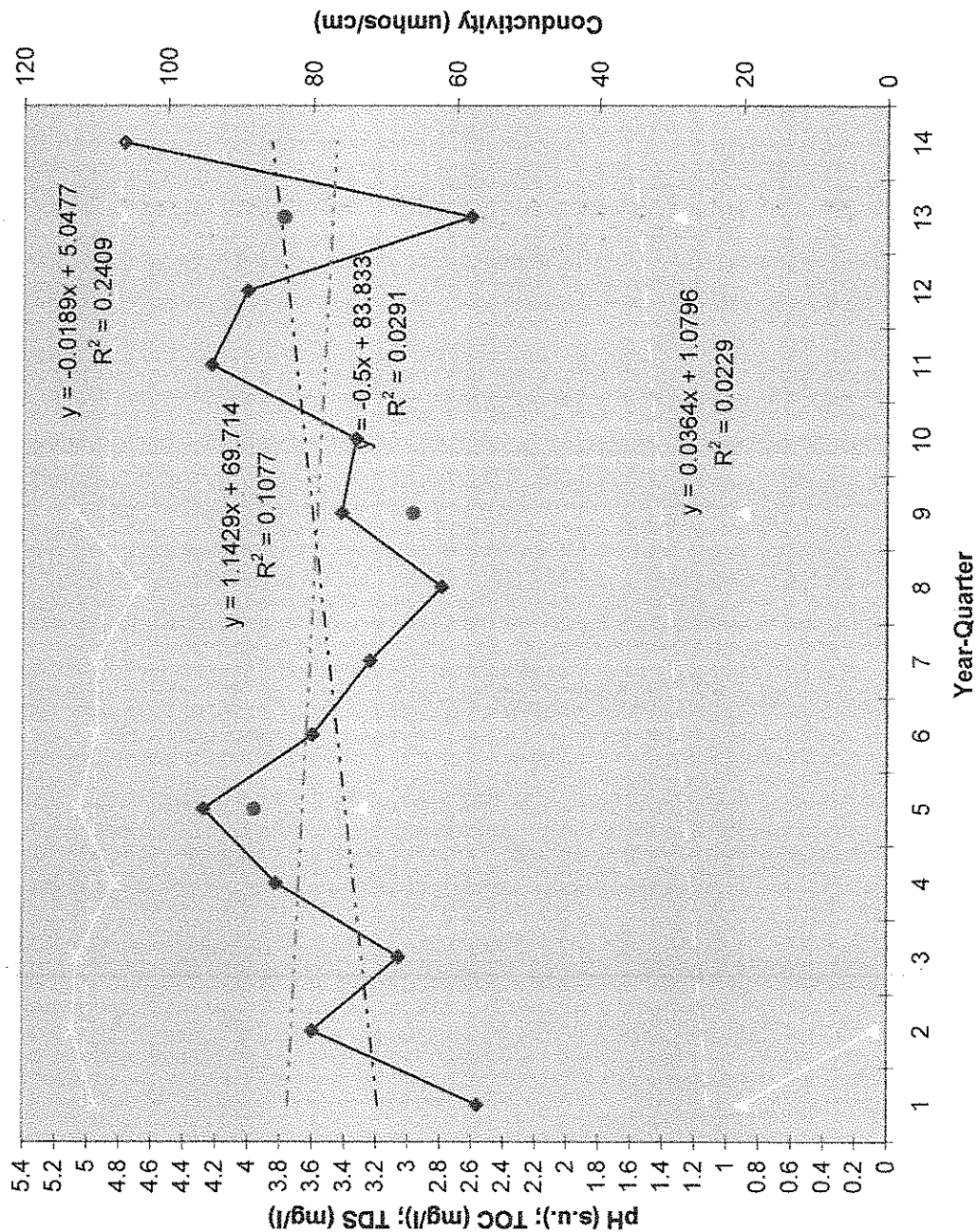
Rappahannock Westminister-Canterbury VPA 0091511 Well #2



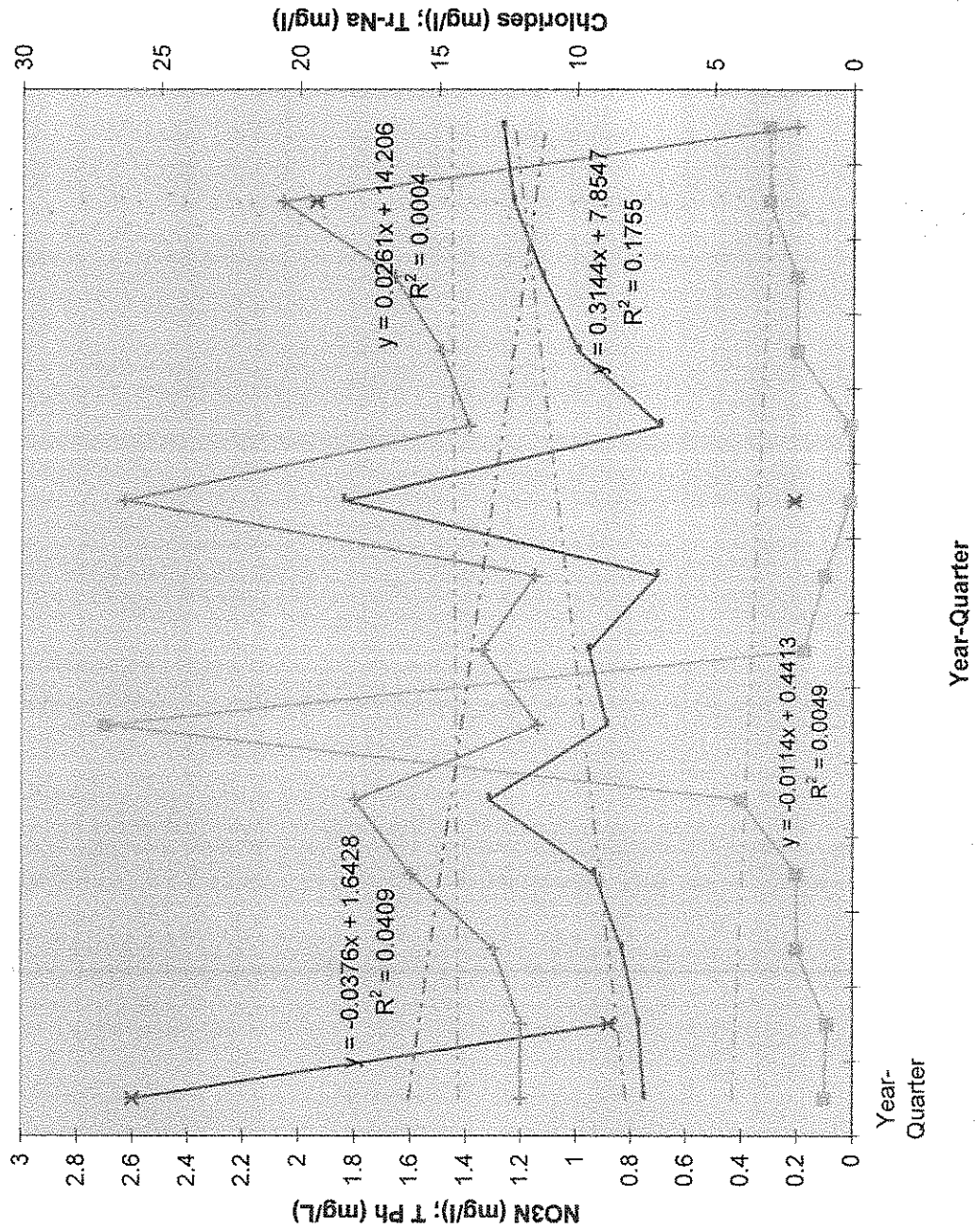
Rappahannock Westminister-Canterbury VPA 0091511 Well #2



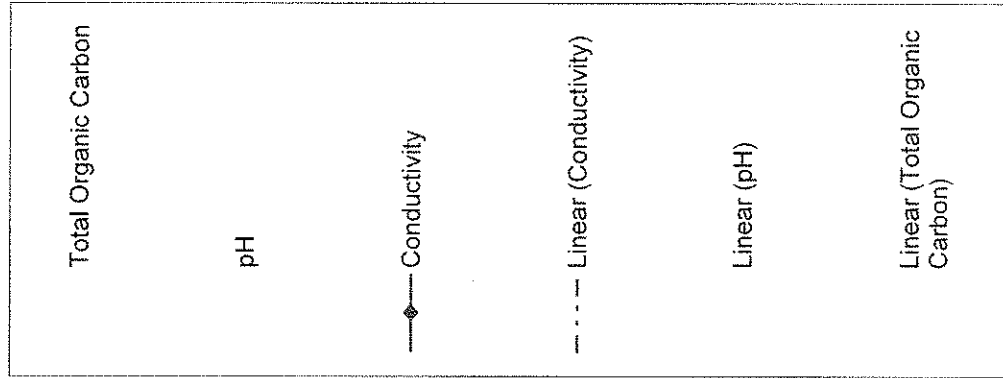
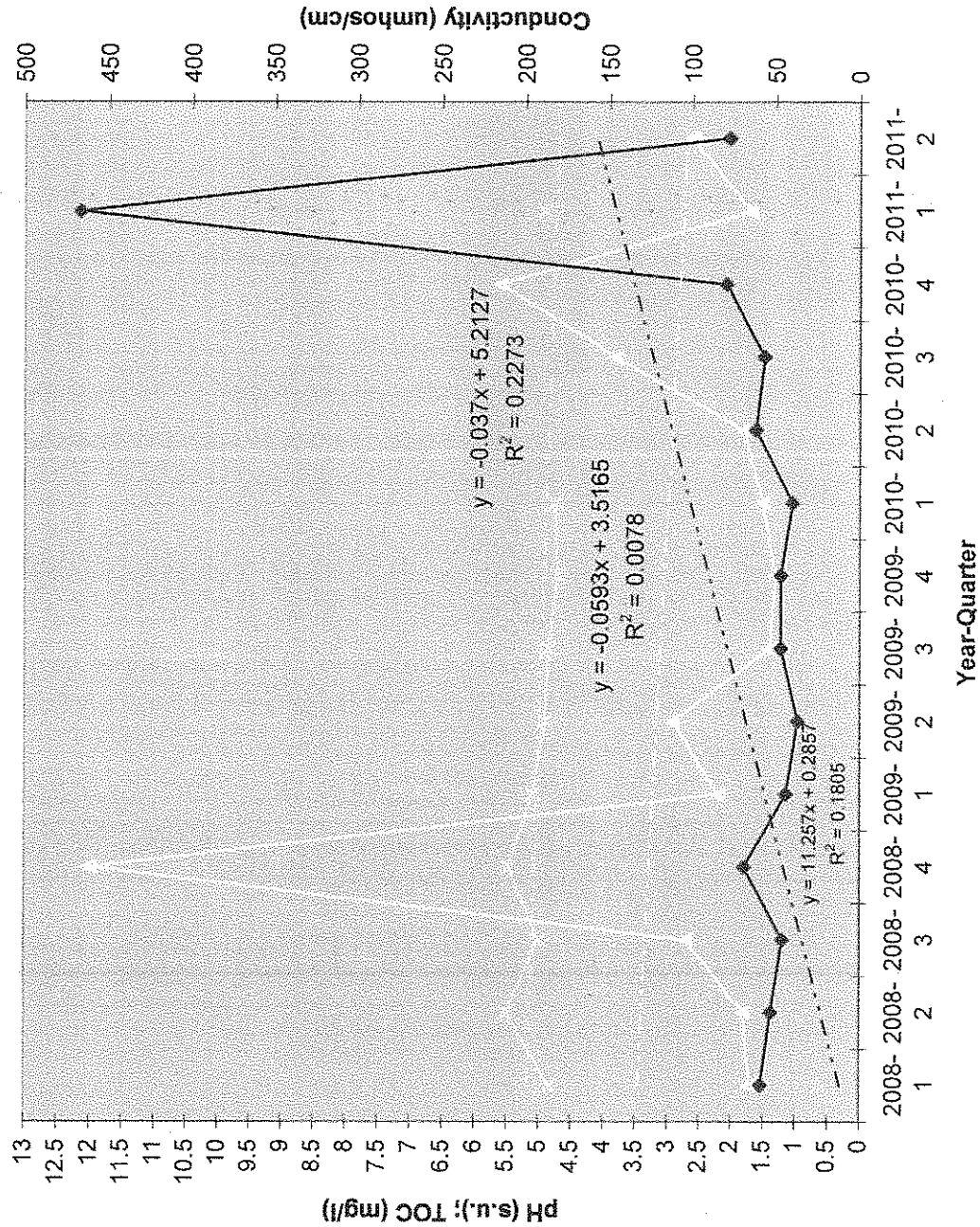
Rappahannock Westminister-Canterbury VPA 0091511 Well #3



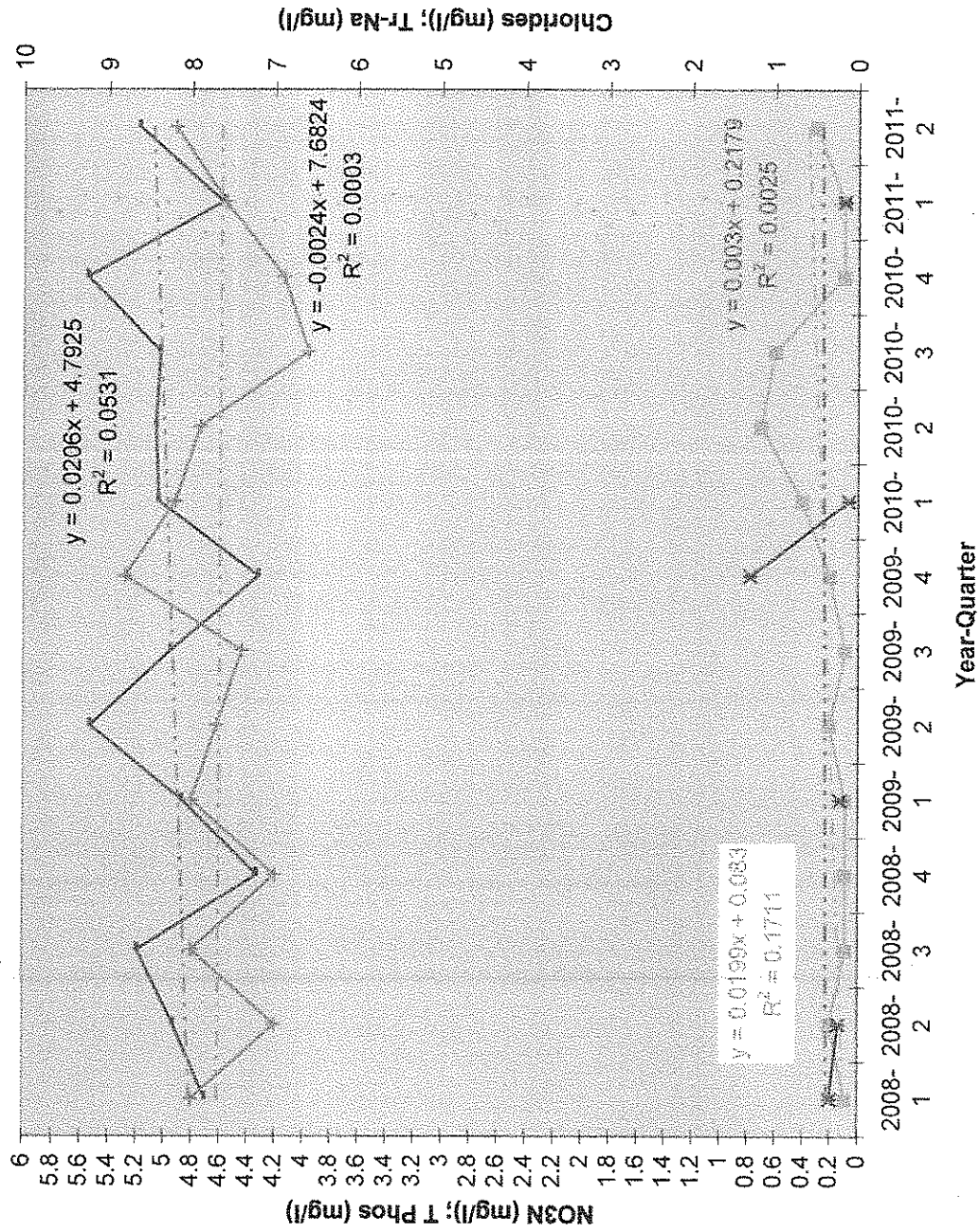
Rappahannock Westminister-Canterbury VPA 0091511 Well #3



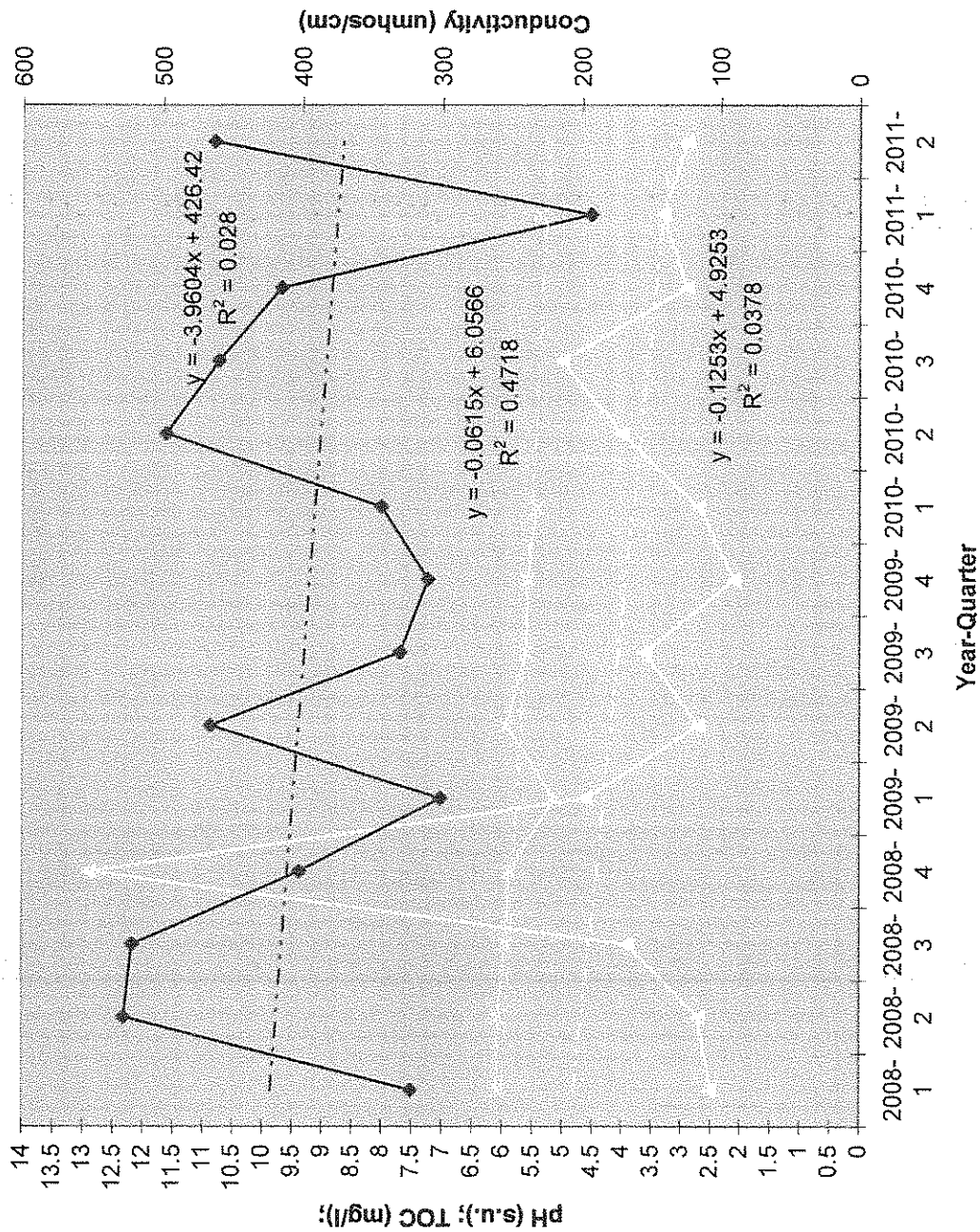
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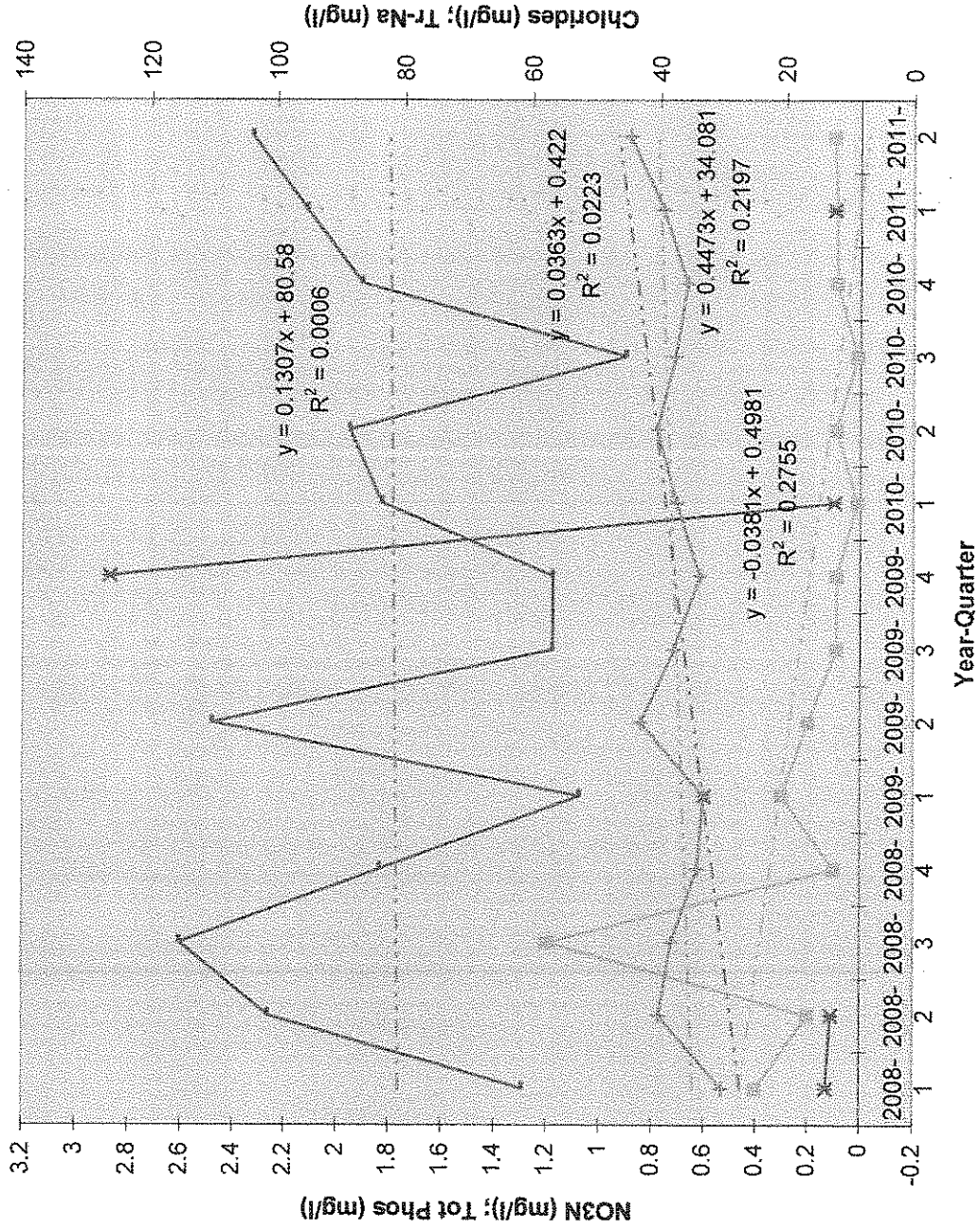
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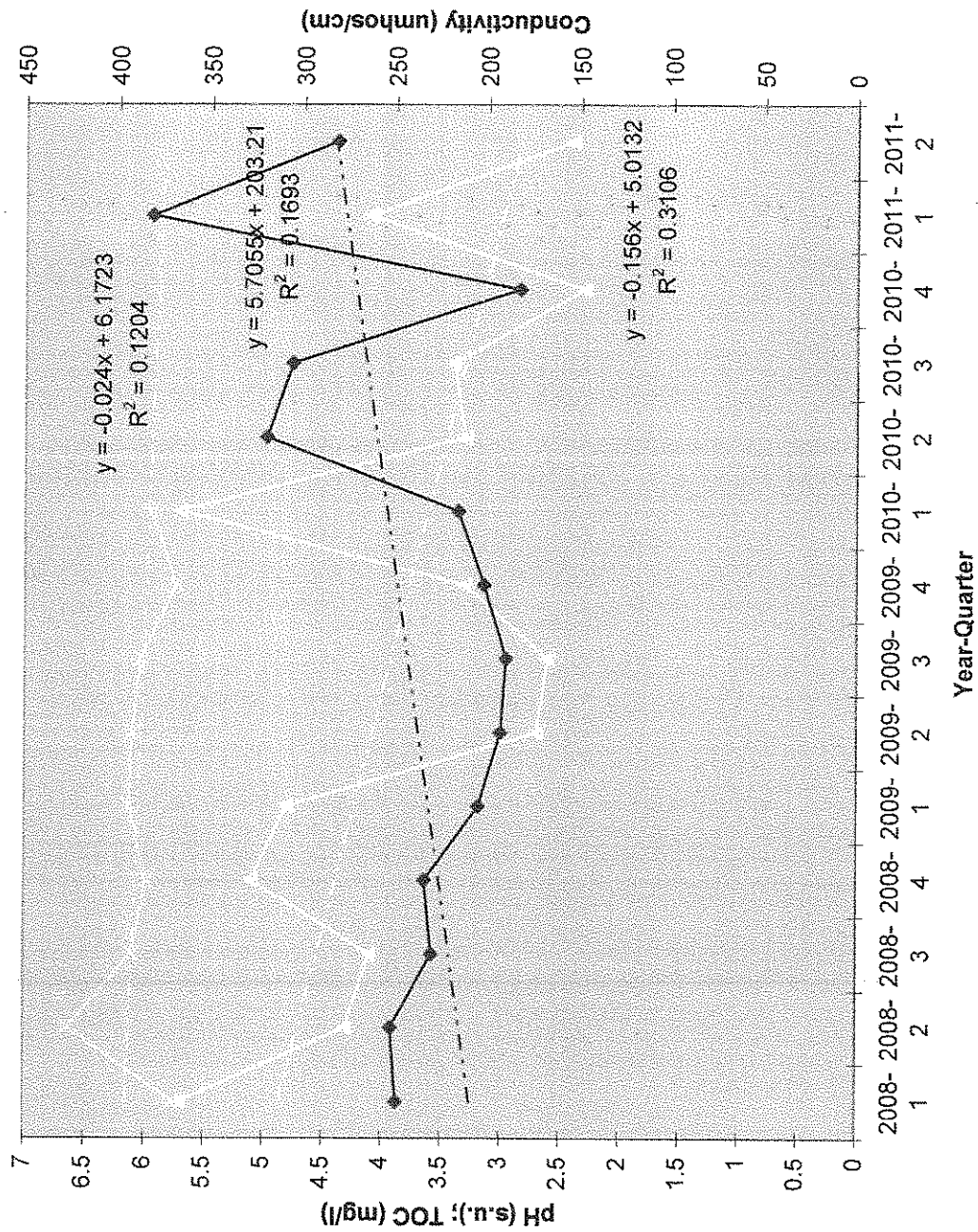
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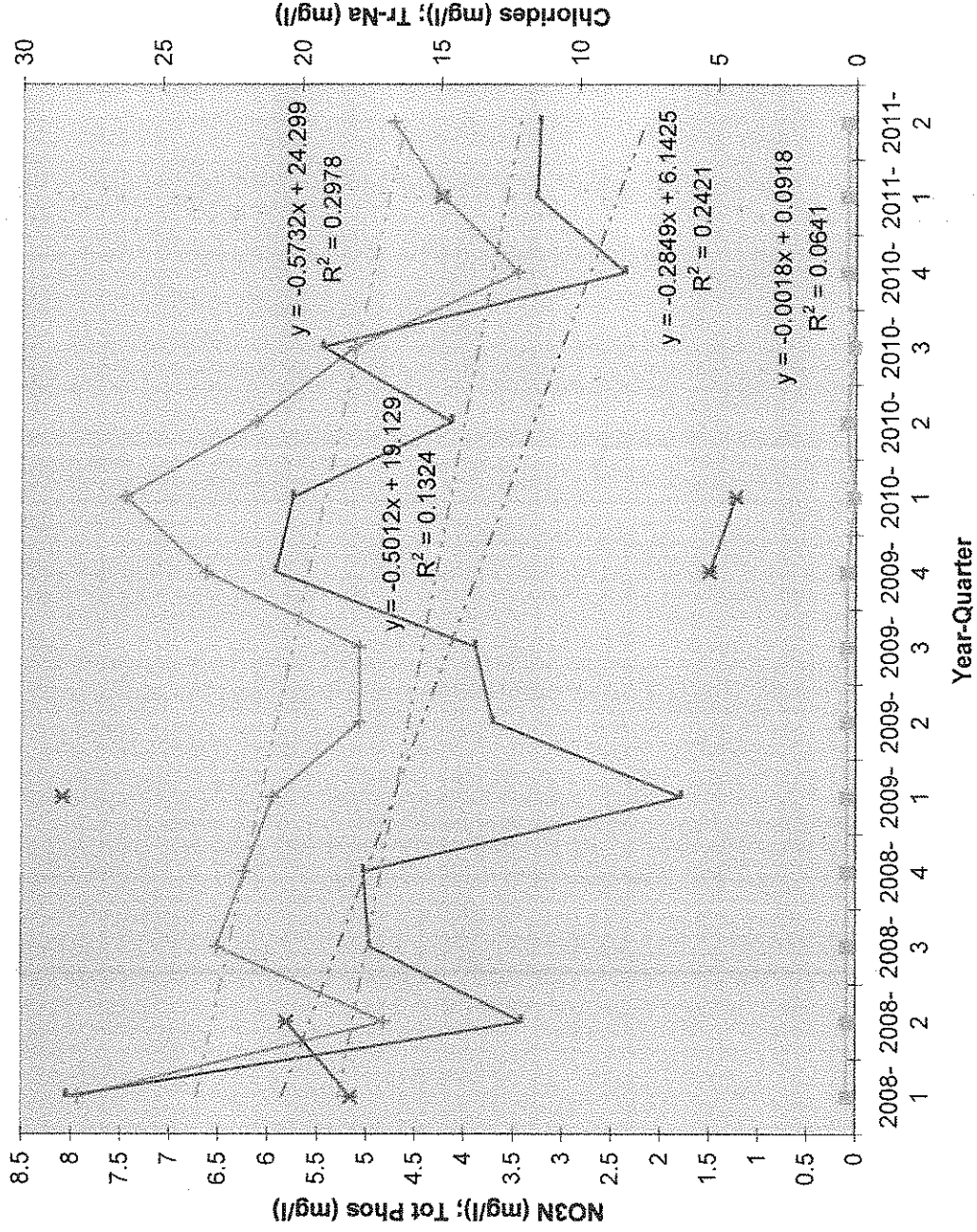
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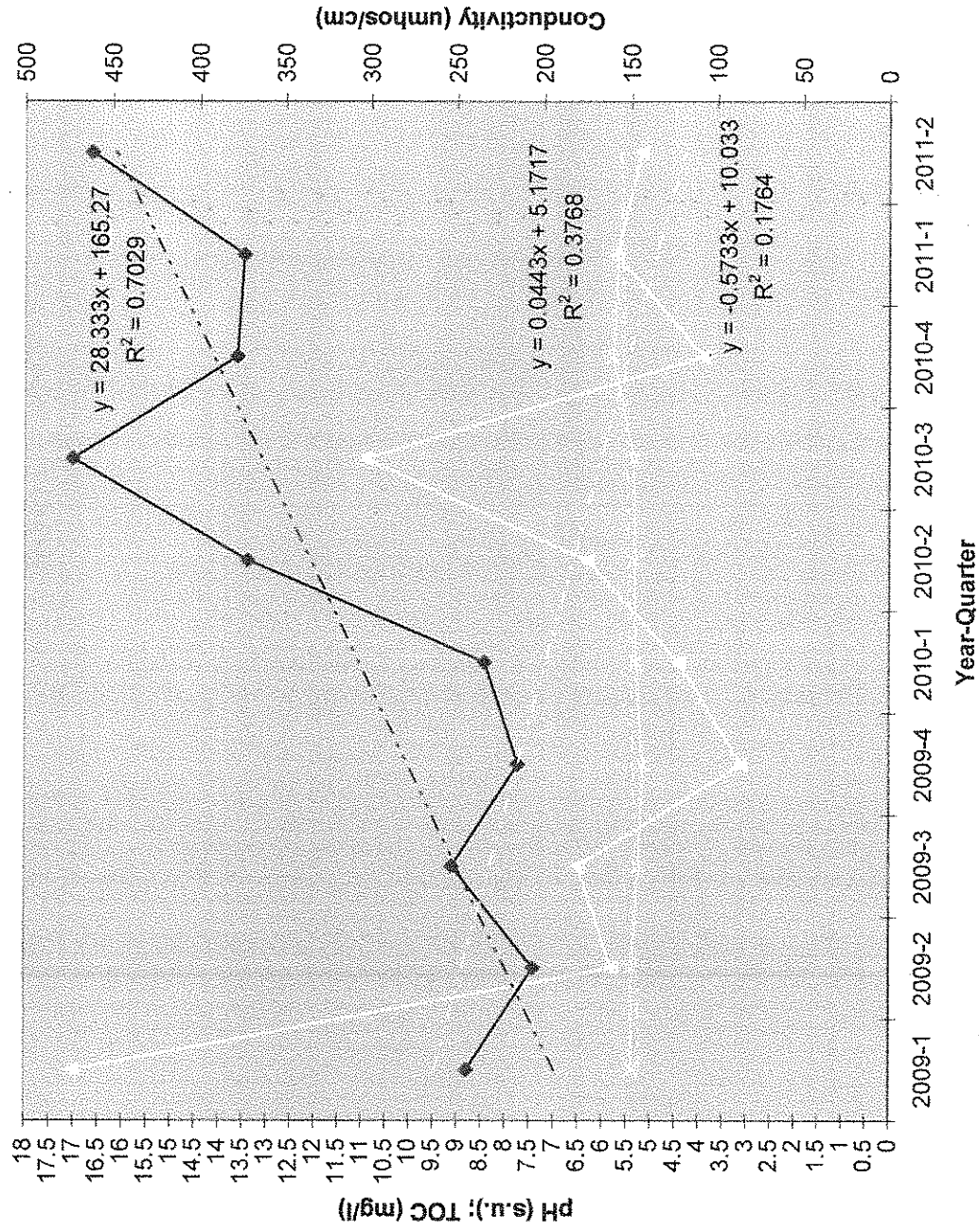
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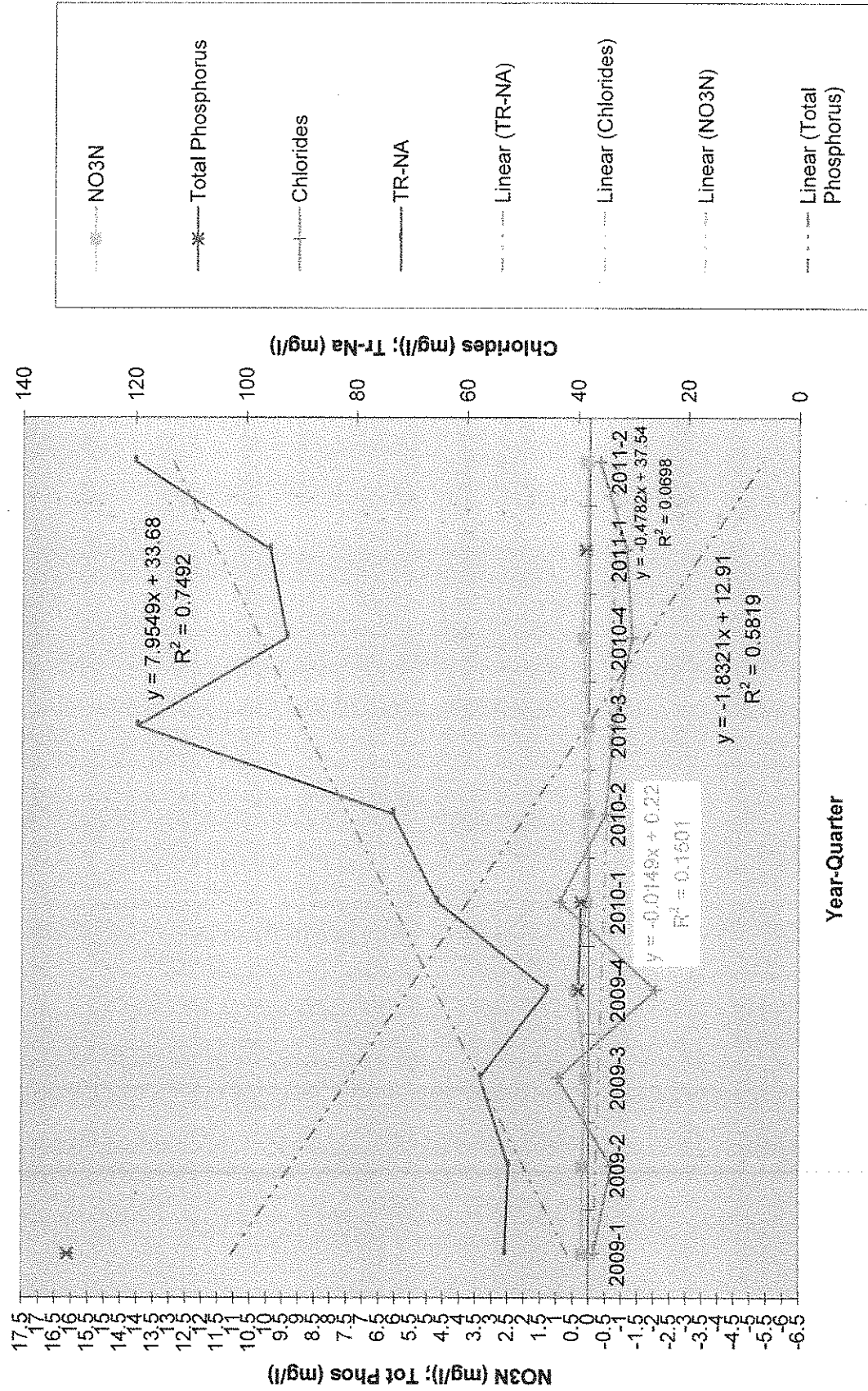
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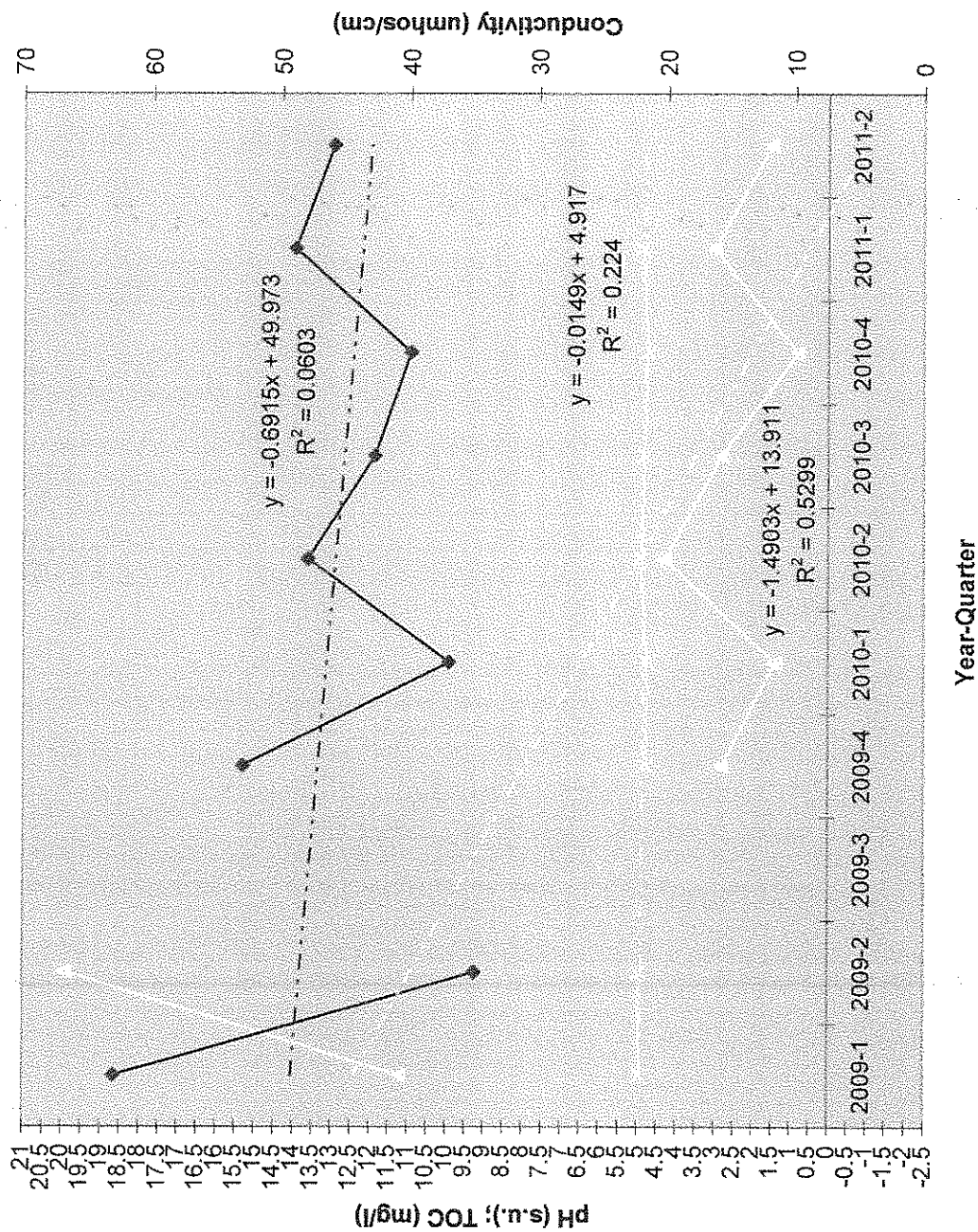
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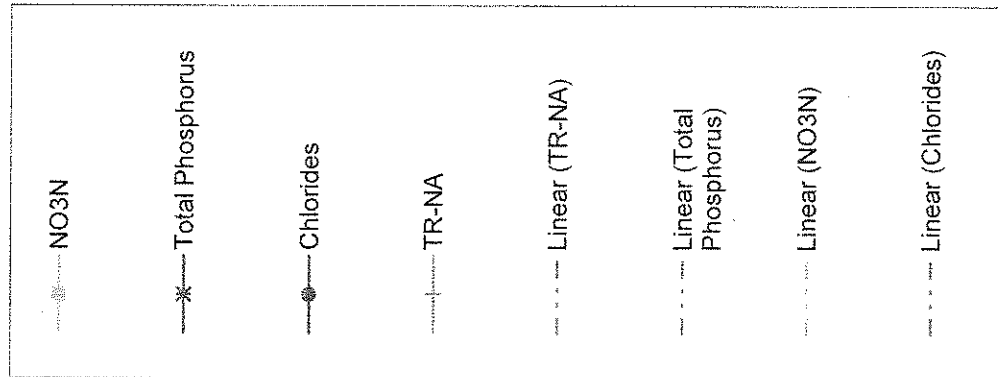
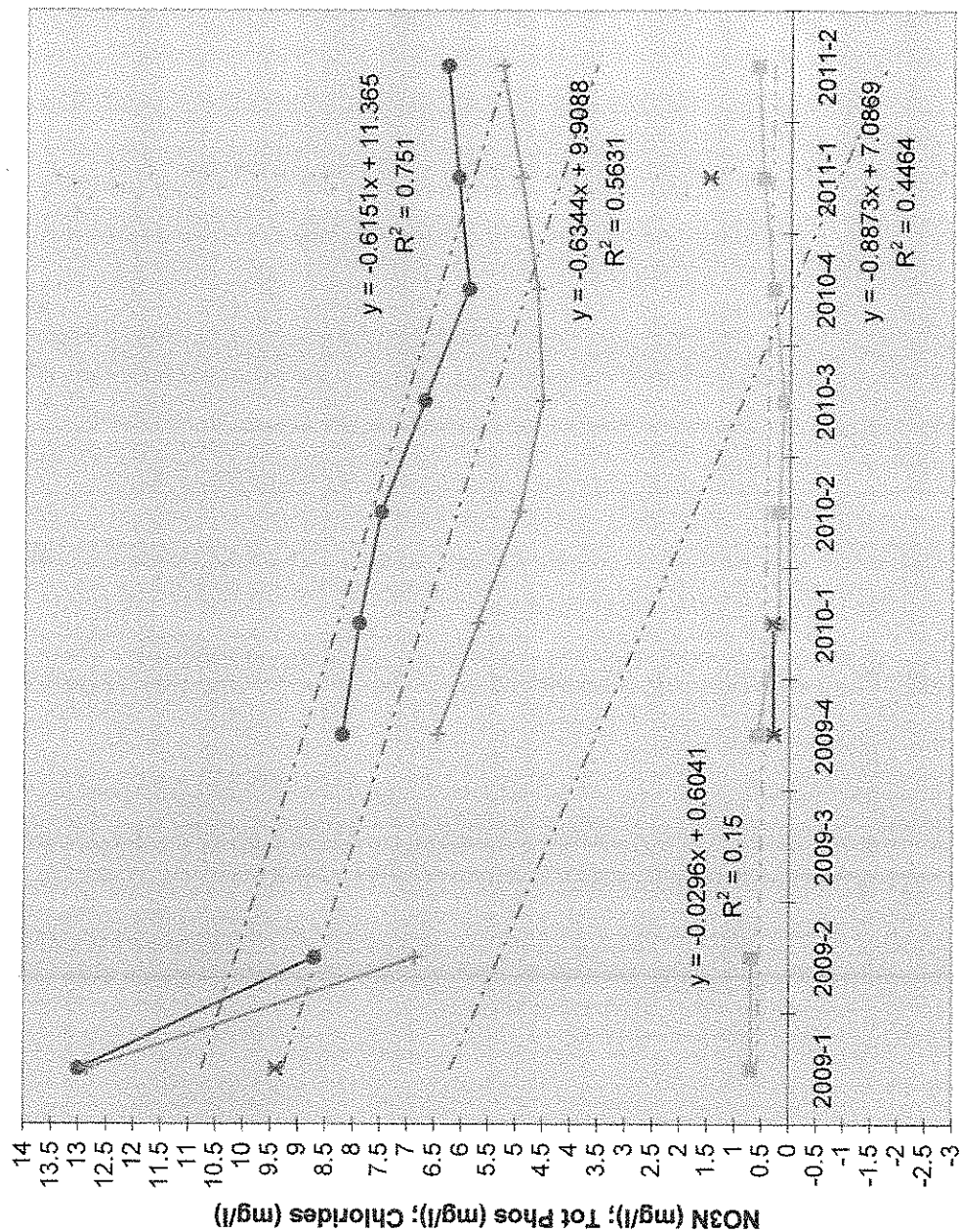
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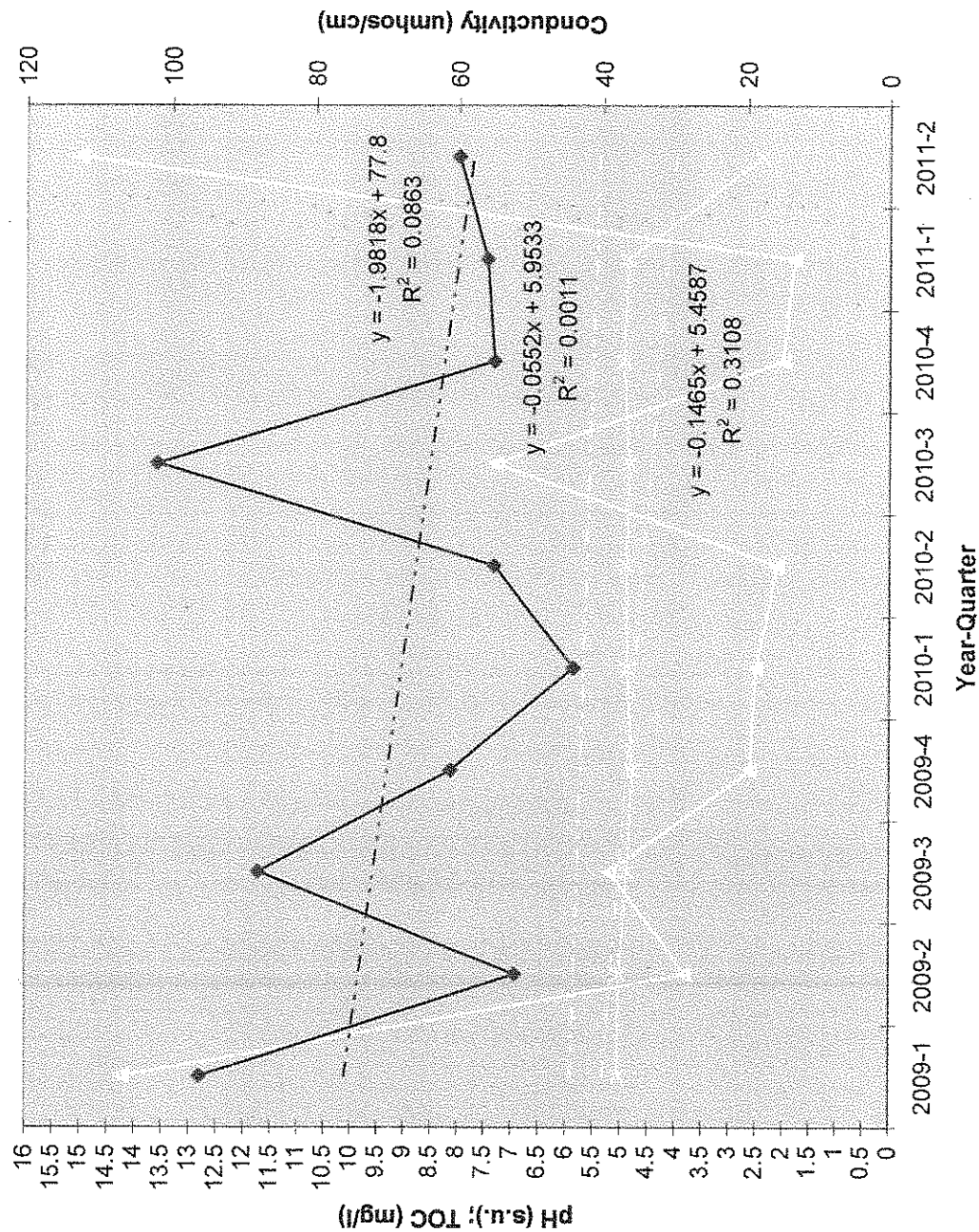
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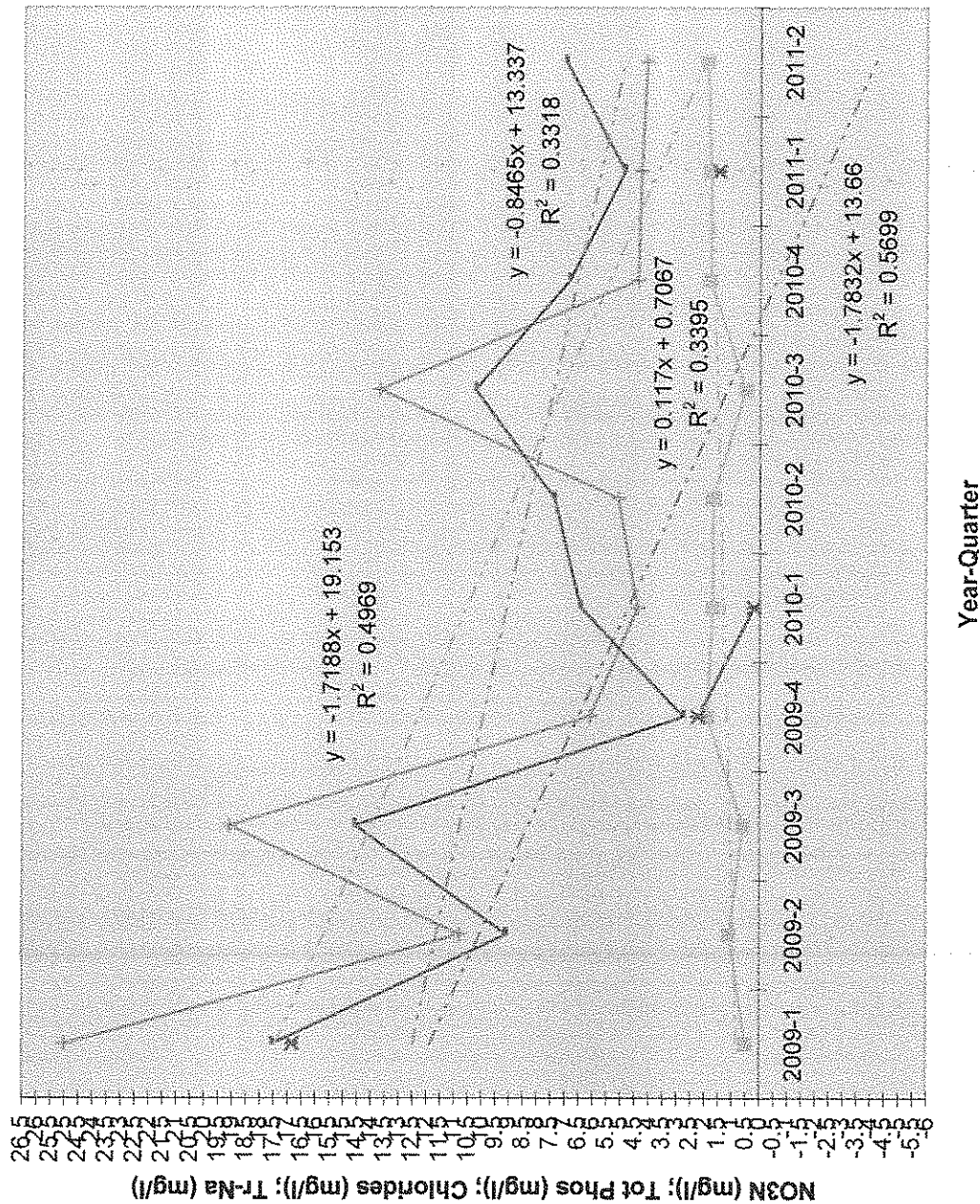
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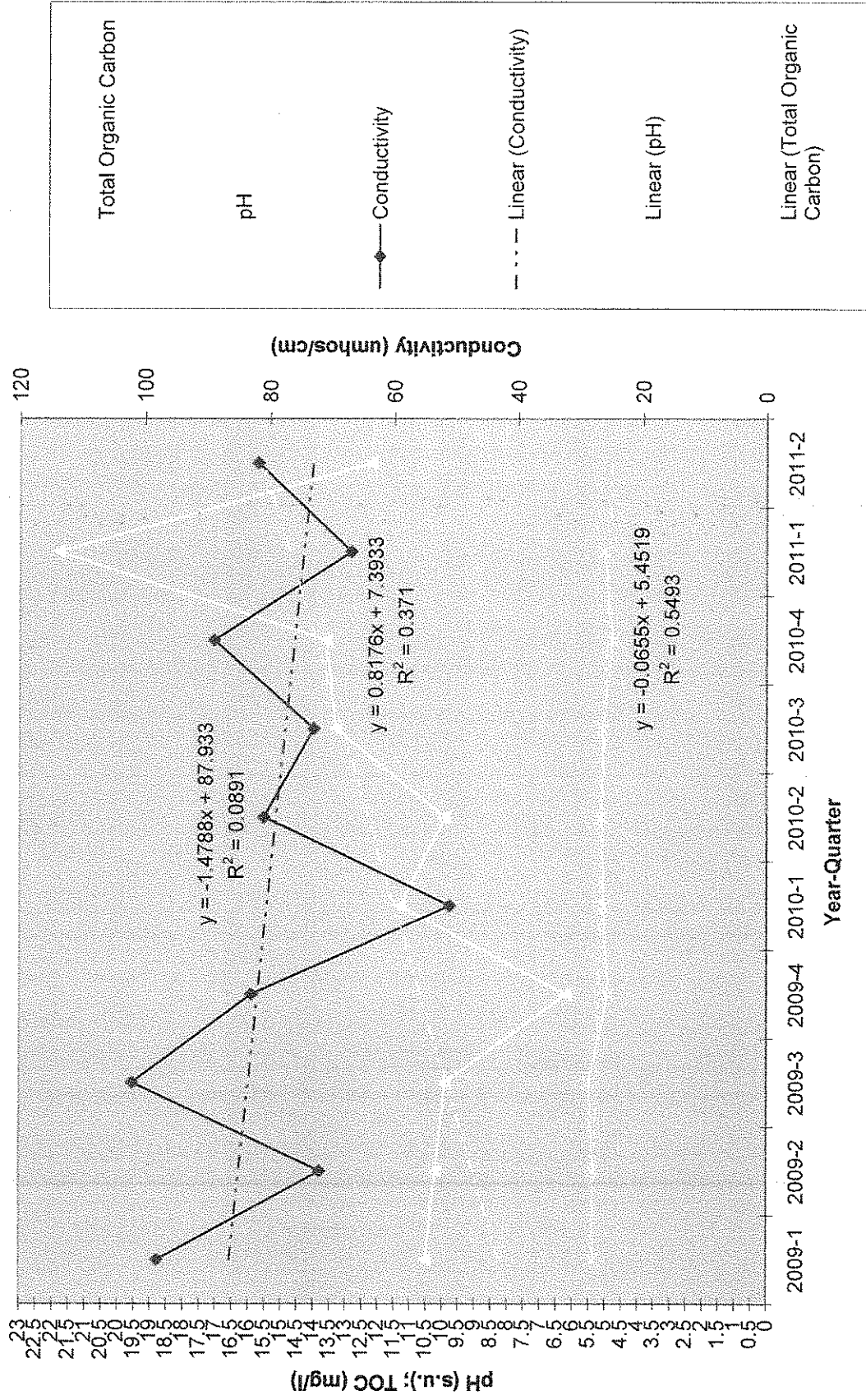
Rappahannock Westminster-Canterbury VPA 0091511 Well #9



Rappahannock Westminister-Canterbury VPA 0091511 Well #9



Rappahannock Westminister-Canterbury VPA 0091511 Well #10



Rappahannock Westminster-Canterbury VPA 0091511 Well #10

